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Internationalisation of innovation in SMEs

Case Studies, Exemplary Support Practices and Policy Implications

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Internationalisation of innovation in SMEs

Case Studies, Exemplary Support Practices and Policy Implications

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EXECUTIVE SUMMARY

Abstract

This study focuses on the combination of two subjects – innovation and internationalisation – which are deemed to be crucial for the European economy. The study has two key parts: (1) twelve case studies of innovative SMEs with insightful international activity and (2) an analysis of strengths, weaknesses, opportunities and threats (SWOT) of European policy measures and infrastructure seeking to enhance such internationalisation.

The **case studies** show that there are many different combinations of types of internationalising innovation, and no dominant scheme. Reaching a sufficient number of customers was found to be the principal driver for internationalisation. The case SMEs use a variety of public support measures for internationalising their innovation activities; European research projects seem to be a prominent way. All case SMEs report positive impacts of internationalisation.

A **SWOT analysis** shows that the main strengths of European policies for supporting SMEs' international activity is the diversity of instruments, their accessibility for all sorts of SMEs, and the clear focus of Horizon 2020 on transnational research, development and innovation cooperation and exchange as a stepping stone towards greater competitiveness on the global scene. However, a weakness is that many coordination and support policy measures that support internationalisation of SMEs focus primarily on export and trade promotion, without necessarily stimulating SMEs' internationalisation of innovation activities.

The study identified four principal challenges when internationalising innovation: having to stay at the top end of international technological and **knowledge** development; establishing **contacts** to foreign countries; dealing with foreign **cultures**; and dealing with governmental **policy**, regulation in particular. Dedicated national and European policy measures may help in tackling these challenges.

Background and objectives

The study about "internationalisation of innovation in small and medium-sized enterprises (SMEs)" for which this report is written is the first study on behalf of the European Commission focusing on SMEs' innovation activities within internationalisation. Hence the study focuses on the combination of two subjects – innovation and internationalisation – which are both deemed to be crucial for the European economy. The study has three objectives: (1) gaining new insights about drivers, barriers and practices of SMEs' internationalisation of innovation; (2) analysing related infrastructures and policy measures; and (3) deriving implications for improved policies.

Based on literature and case study research, the study distinguishes five **types of internationalising innovation**: (a) Establishing subsidiaries in foreign countries for innovation purposes; (b) Innovation involving a foreign partner; (c) Customising innovative products or services for the target market without necessarily having a foreign partner; (d) Intellectual property acquisition from or sales to a foreign country; (e) Hiring research or innovation management staff from foreign countries (see Section 2.1).

In academic **literature** there is a consensus that internationalisation is beneficial for the long-term growth and survival of SMEs. There is also the suggestion that sustainable internationalisation goes beyond exports and is driven by innovation (see Section 2.2). Moreover, the few sources that help in drawing a **statistical picture** suggest that there is modest activity in European SMEs to internationalise innovation activities (see Section 2.3). Furthermore, policy measures should be based on **theoretical considerations** of market failure as well as government failure. Theoretical approaches of innovation management, diffusion of innovations, and competitive advantage may also help design effective and efficient policies (see Section 2.4).

Case studies

Chapter 3 of this report presents and analyses **twelve case studies** of SMEs' activities to internationalise innovation. The main purpose of the case studies is to clarify drivers and barriers, types of practices, and impacts of the international innovation activity. The SMEs selected for case study research fulfil specific characteristics: they have their headquarters in Europe, were founded before 2010, represent different types of internationalising innovation activities, and stem from a broad variety of industries. The study examined the following SMEs.

Company name, country	Business activity
Acreo, Sweden	ICT solutions for sustainable growth and competitiveness in industry and society
Aisense, Slovenia	Developing and selling a handheld gamma radiation hotspot locator
Food Freshly, Germany	Marketing of products and services for keeping cut fruit and vegetables fresh
Intermet, Poland	Manufacturing and sales of critical infrastructure protection systems and modular affordable housing solutions
Kapro, Israel	High-end construction and carpentry tools
KeyGene, Netherlands	Natural genetic variation in vegetable and other 6F crops
LifeTec, Netherlands	Compliance and efficacy studies of healthcare products, interventions and therapies
Numeca, Belgium	Developing and producing software tools for computational fluid dynamics and analysis
poLight, Norway	High performance micro optics autofocus components
Real Project Partner, France	Developing and deploying products with fibre and power line technology, particularly combining TV and smart metering
Ticketbis, Spain	Operating an online secondary market platform for buying and selling event tickets customer-to-customer
Weprog, Denmark/Germany	Ensemble weather forecasting mainly for the renewable energy industry

The case studies provide numerous examples of how SMEs internationalise their innovative activities. The cases show that there are many different combinations of the types of internationalising innovation, and no dominant scheme appears to be visible. Each SME performs the types that are most suitable to its profile, business objectives, customer requirements, and competitive situation. Collaborating with partners in foreign countries was found to be the most prevalent type. Customising goods for foreign markets, establishing subsidiaries for innovation purposes and hiring innovative staff from abroad were also found to be frequent. Acquiring or selling intellectual property from foreign countries is apparently not so common.

The case studies show that reaching a sufficient number of customers or more **customers is the principal driver** for internationalising SMEs' innovative activities. Most case SMEs offer highly specialised products or services for which the national or European market would be too small to run a sustainable business, or which require international resources. Vice versa, if a technology is globally used and the market is not restrained by local conditions, an SME has to go international in order to remain competitive.

Three issues can be noted about the **challenges** which the case SMEs face in their international business, related to number, strength, and specificity: First, the SMEs elaborated on numerous different challenges. Second, by and large such challenges were found to be well manageable. Third, the challenges can be quite specific to the companies' particular business activity. The challenges can be subdivided into four groups: geographical, cultural, governmental, and business-related. The barrier for going international mentioned most frequently is cultural differences, which

require cautious communication and which may lead to prolongation or even failure of negotiations, and difficulties in remote management.

The case SMEs use a variety of **public support measures** for internationalising their innovation activities. Most prominent was participation in European and also national research projects. This was partly due to a selection of enterprises identified through European programmes. Some SMEs used national promotion programmes and trade missions. In many cases, the SMEs developed their international business rather simple through chambers of commerce and trade, international trade exhibitions as well as national embassies.

All case SMEs report **positive impacts of internationalising** their innovation activities. Internationalisation helped sustain and expand business as well as improving the quality of products, services and customer relationships.

SWOT analysis

Chapter 4 classifies the existing EU policy measures in support of internationalisation. That is, for each policy measure the study team indicates whether it is primarily focused on export and trade, international production and/or international R&D and innovation. We use the assessment by the European Commission of EU instruments contributing to the internationalisation of European enterprises as a starting point for our own stock taking of EU instruments, and combine this with insights from desk research. This results in an overview of policy measures supporting the internationalisation of innovation of SMEs. The most important policy measures regarding internationalisation of innovation of SMEs can be grouped under a few policy programmes of the European Commission: COSME, the former ICI & ICI+ which is now replaced by the Partnership Instrument, and Horizon 2020.

Before evaluating the EU policy measures we have described a number of best practices at the national level:

Case label, country	Exemplary practise
Business Cooperation for International Innovation (Spain)	Through internationalisation, businesses improve cooperation and the management of, and investment in, R&D and innovation.
Get in the Ring start-up competition (Netherlands)	Promotes an international orientation among SME entrepreneurs, empowers a global community of 20,000 entrepreneurs who can solve worldwide challenges.
Netzwerk Hessen-China (Germany)	One of the most successful research collaboration initiatives that has promoted and intensified commercial, cultural and scientific relations between Europe and China.
Industrial Research and Development Contracts (Norway)	The scheme provides grants to R&D-projects where a SME supplier teams up with a demanding, larger and preferably international customer.
Partner Matching Services (Israel)	Uses the global diaspora of Israeli entrepreneurs to connect SMEs and large firms all over the world, and to setup bilateral programs for collaborative industrial R&D ventures.
Mobility for Growth (Sweden)	Funding mechanism for incoming and outgoing transnational mobility for experienced researchers, promoting active international collaboration between the organizations involved.
Women in Global Business (Australia)	National program (including mentoring) to support businesswomen to take their products and services to the world.
Science & Technology Centres (India)	Bilateral S&T centres that use various modes of cooperation and have a wider range among businesses.

An important **strength** of the current portfolio of support measures is that it covers a broad range of policy measures in support of internationalisation of SMEs covering the various types of international activities of firms. In general, these policy measures appear to have a positive effect on the likelihood of firms to cooperate with partners in other (European) countries, and thus

boosting knowledge flows through cooperation and innovation. They do not only allow firms to have a (first) experience with cooperation, but these policy measures are also increasing the likelihood of continuing to collaborate over time. Especially while more complex strategic alliances are risky to set up, public support programmes for collaborative R&D projects offer an important opportunity. This is especially the case for SMEs that would not have entered into a cooperation agreement otherwise.

On the other hand, it may be a **weakness** that there is a lack of consistent promotion of research and innovation across the different EU programmes and measures for internationalisation. At the moment, most measures for internationalisation are aimed at export promotion, to some extent also at promoting production in foreign countries (for instance through Foreign Direct Investment) but less often at research and innovation promotion. This means that the contribution of research and innovation to EU policy goals such as SMEs' competitiveness and growth or fostering economic stability in partner nations is currently limited. Second, many SMEs, including innovative ones, are struggling with the complexity of the different EU programmes and with the fragmentation of the broad portfolio of policy instruments. This also applies to the instruments available at national, regional and sometimes local levels. Third, EU coordination and support activities are often rather generic in nature and could fit the characteristics of the specific target groups better, i.e. innovative SMEs that share a specific knowledge base. Working more on a sector- or technology-specific basis or both could be one way to address this issue.

Despite the apparent strengths there are still a lot of **opportunities** to improve the current portfolio of policy instruments. The existing schemes for research collaboration seem to be good starting points for innovative SMEs to build international networks. They could use the networks of their partners to get access to partners or customers outside Europe. Another opportunity is to adapt existing generic export and trade promotion schemes to the specific needs of innovative SMEs, e.g., by including elements of customization or IPR support. There are also various opportunities to promote internationalisation of innovation via improving broader preconditions, including improving the overall business performance of SMEs (e.g., by improving the competences of the management) and by fostering an international orientation among SME entrepreneurs.

Relevant **threats** include, firstly, that many Member States' innovation systems, with regard to public finance of R&D, increasingly rely on public EU funding. A second threat is the emergence of China as the global scientific force and its further expansion into higher value services, including global internet services, and manufacturing.

Policy implications

Governments should base the design of policy measures on empirical evidence, and the measures should be derived from concrete challenges which innovative SMEs face when they go international. The study identified four principal challenges when internationalising innovation: having to stay at the top end of international technological and knowledge development; establishing contacts to foreign countries; dealing with foreign cultures; and dealing with governmental policy, regulation in particular.

As regards **knowledge**, European research and development projects[1] apparently play a vital role not only for pushing technological frontiers forward but also for expanding international networks of innovation partners. The case studies and the SWOT analysis do not suggest specific revisions of European research and innovation projects with regard to the international dimension. However, the SWOT analysis suggests to simplify SMEs' participation in European programmes and to align national and European programmes because many SMEs perceive European programmes as too complex. Furthermore, SMEs may be well advised to be wary of in-crowds of large firms in order to

[1] Including research and innovation actions in Horizon 2020 terminology.

have their interests represented well. Careful network management may also be needed to naturally transit from smaller to bigger projects and consortia.

As regards international **contacts**, the case studies suggest that governments and governmental agencies can support finding such contacts, for example through specific agencies, trade missions and local contact points in foreign countries. Support through conventional institutions like chambers of commerce and trade as well as national embassies appears to be sufficient in many cases. However, export and trade measures could expand their focus; they could be adapted to the specific needs of innovative SMEs. For example in trade missions: Innovation-oriented trade missions could focus on earlier stages of product development rather than on the later commercialisation phases, target potential partners for R&D&I collaboration rather than customers, and be aimed at a certain sector or technology.

While the study identified foreign **cultures** as a frequent challenge for internationalising SMEs' innovation activities, most case SMEs were found to be able to manage related issues without much further support. SMEs need to take the cultures as they are because they do not have the power or the resources to try influencing behaviour and thinking of foreign interlocutors. However, public agencies, chambers of trade and embassies can be helpful for interacting with business partners from foreign cultures. In a broader sense, policy measures could pay more attention to promoting an international orientation among entrepreneurs.

Whereas the study did not identify many needs for specific new or enhanced **governmental policies** to support internationalisation of innovative SMEs, there may rather be a need for designing general policies and regulations to be more business-friendly. Enterprises going abroad have to comply with legal norms which may differ from country to country even in Europe, and regulation may impede business. There may also be unfavourable governmental savings policies and specific types of protectionism. The European Commission can be recommended to further seek harmonising regulations across Europe for specific markets such as the secondary market for event tickets. In other fields such as agricultural biotechnology, regulations may need to be implemented more swiftly for providing a clear regulatory environment.

In general, the European Commission can be recommended to **design policy support measures aimed at internationalisation and innovation in conjunction** because research suggests that both are interrelated. Despite the apparent strengths, there are still a lot of opportunities to improve the current portfolio of policy instruments. Policy instruments that are geared towards internationalisation can also be used to stimulate innovation, and policy measures that are geared towards research and innovation can be aimed at internationalisation, too. The coordination between these two strands can also be improved. Finally, there are several generic policy instruments that can potentially improve the preconditions for internationalisation of innovation, e.g. with regard to human resources and entrepreneurship.

RESUME

Extrait

Cette étude se concentre sur l'association de deux sujets (l'innovation et l'internationalisation) qui sont considérés comme cruciaux pour l'économie européenne. L'étude comprend deux parties clés : (1) 12 études de cas de PME innovantes ayant une activité internationale pertinente et (2) une analyse des forces, faiblesses, possibilités et menaces (FFPM) des mesures politiques européennes et de l'infrastructure cherchant à améliorer ladite internationalisation.

Les **études de cas** montrent qu'il existe plusieurs combinaisons différentes de types d'innovation à l'international et aucun plan dominant. Atteindre un nombre suffisant de clients s'est révélé être le principal moteur de l'internationalisation. Les PME étudiées utilisent différentes mesures de soutien public pour internationaliser leurs activités d'innovation ; les projets européens de recherche semblent être un moyen important. Toutes les PME étudiées signalent les impacts positifs de l'internationalisation.

Une **analyse FFPM** montre que les principales forces des politiques européennes pour soutenir l'activité internationale des PME sont la diversité des instruments, leur accessibilité pour toutes sortes de PME et l'objectif clair d'Horizon 2020 relatif à la recherche transnationale, au développement et à la coopération en matière d'innovation ainsi qu'à l'échange comme tremplin vers une plus grande compétitivité sur la scène mondiale. Cependant, de nombreuses mesures politiques de coordination et de soutien qui aident l'internationalisation des PME se concentrent principalement sur l'exportation et la promotion commerciale sans nécessairement stimuler l'internationalisation des activités d'innovation des PME ; ce qui constitue une faiblesse.

L'étude a identifié quatre défis principaux au moment d'internationaliser l'innovation : rester à un niveau très élevé de développement technologique international et des **connaissances** ; établir des **contacts** avec les pays étrangers ; traiter avec les **cultures** étrangères ; gérer la **politique** gouvernementale, notamment la réglementation. Des mesures politiques nationales et européennes dédiées peuvent aider à relever ces défis.

Contexte et objectifs

L'étude sur « l'internationalisation de l'innovation dans les petites et les moyennes entreprises (PME) » pour lesquelles ce rapport a été écrit, est la première étude pour le compte de la Commission européenne qui se concentre sur les activités d'innovation des PME au sein de l'internationalisation. De ce fait, l'étude se concentre sur l'association de deux sujets (l'innovation et l'internationalisation) qui sont considérés comme cruciaux pour l'économie européenne. L'étude a trois objectifs : (1) obtenir de nouvelles idées sur les moteurs, les barrières et les pratiques des petites entreprises relatives à l'internationalisation de l'innovation ; (2) analyser les infrastructures liées et les mesures politiques ; ainsi que (3) les implications en découlant pour les politiques améliorées.

Basée sur la littérature et l'examen d'études de cas, l'étude distingue cinq **types d'innovations à l'international :** (a) la création de filiales dans des pays étrangers à des fins d'innovation ; (b) l'innovation impliquant un partenaire étranger ; (c) la personnalisation des produits ou services innovants pour le marché cible sans nécessairement avoir un partenaire étranger ; (d) l'acquisition de droits de propriété intellectuelle de ou leur vente à un pays étranger ; (e) l'embauche de personnel d'encadrement dans la recherche ou l'innovation provenant de pays étrangers (voir Partie 2.1).

Dans la **littérature** académique, il existe un consensus selon lequel l'internationalisation est bénéfique pour la croissance sur le long terme et la survie des PME. Il est également suggéré que l'internationalisation durable va au-delà des exportations et est entraînée par l'innovation (voir Partie 2.2). De plus, les quelques sources permettant de dessiner un **tableau statistique**

suggèrent que l'activité dans les PME européennes pour internationaliser les activités d'innovation est modeste (voir Partie 2.3). Par ailleurs, les mesures politiques devraient se fonder sur les **considérations théoriques** de la défaillance du marché et du gouvernement. Les approches théoriques sur la gestion de l'innovation, la diffusion des innovations et l'avantage concurrentiel peuvent également aider à concevoir des politiques efficaces et efficientes (voir Partie 2.4).

Études de cas

Le chapitre 3 de ce rapport présente et analyse **douze études de cas** sur les activités de PME pour internationaliser l'innovation. L'objectif principal des études de cas est d'expliquer les moteurs et les barrières, les types de pratiques et les impacts de l'activité d'innovation internationale. Les PME choisies pour les études de cas présentent des caractéristiques spécifiques : leur siège social se situe en Europe ; elles ont été créées avant 2010 ; elles représentent différents types d'activités d'innovation à l'international et elles proviennent d'industries très variées. L'étude a examiné les PME suivantes.

Nom de la société, pays	Activité commerciale
Acreo, Suède	Solutions issues des Technologies de l'Information et de la Communication (TIC) pour une croissance durable et la compétitivité dans l'industrie et la société
Aisense, Slovénie	Développement et vente d'un détecteur portable de rayonnements gamma
Food Freshly, Allemagne	Commercialisation de produits et services pour conserver les fruits et les légumes coupés au frais
Intermet, Pologne	Fabrication et vente de systèmes de protection d'infrastructures critiques et de solutions de logement modulaires abordables
Kapro, Israël	Construction haut de gamme et outils de charpenterie
KeyGene, Pays-Bas	Variation génétique naturelle des légumes et autres cultures 6F
LifeTec, Pays-Bas	Études sur la conformité et l'efficacité des produits de santé, des interventions et des thérapies
Numeca, Belgique	Développement et production d'outils logiciels pour la dynamique numérique des fluides et analyse
poLight, Norvège	Composants de mise au point automatique micro-optiques haute performance
Real Project Partner, France	Développement et diffusion de produits avec la fibre et la technologie des courants porteurs, notamment en associant la TV et le comptage intelligent
Ticketbis, Espagne	Exploitation d'une plate-forme en ligne de marché secondaire pour l'achat et la vente de tickets d'événements, de particulier à particulier
Weprog, Danemark/Allemagne	Prévisions météorologiques d'ensemble principalement pour l'industrie des énergies renouvelables

Les études de cas fournissent de nombreux exemples sur la manière dont les PME internationalisent leurs activités innovantes. Les cas montrent qu'il existe différentes associations de types d'innovation à l'international et aucun plan dominant ne semble être visible. Chaque PME exécute les types les plus appropriés à son profil, à ses objectifs commerciaux, aux exigences de ses clients et à la situation concurrentielle. La collaboration avec des partenaires dans des pays étrangers s'est révélée être le type le plus répandu. Personnaliser des marchandises pour les marchés étrangers, créer des filiales à des fins d'innovation et embaucher du personnel innovant de l'étranger sont également fréquents. Acquérir ou vendre des droits de propriété intellectuelle de pays étrangers n'est apparemment pas très courant.

Les études de cas montrent qu'atteindre un nombre suffisant de clients ou obtenir plus de **clients est le moteur principal** de l'internationalisation des activités innovantes des PME. La plupart des

PME étudiées proposent des produits ou services très spécialisés pour lesquels le marché national ou européen serait trop petit pour diriger une entreprise durable ou qui nécessitent des ressources internationales. Vice versa, si une technologie est utilisée dans le monde entier et si le marché n'est pas restreint par des conditions locales, une PME doit s'internationaliser pour rester compétitive.

On note trois problèmes concernant les **défis** rencontrés par les PME étudiées, dans leur activité internationale. Ils sont liés au nombre, à la force et à la spécificité : Premièrement, les PME se heurtent à de nombreux défis divers. Deuxièmement, dans l'ensemble, lesdits défis se sont révélés être gérables. Troisièmement, les défis peuvent être assez spécifiques à l'activité commerciale particulière des sociétés. Les défis peuvent être subdivisés en quatre groupes : géographique, culturel, gouvernemental et commercial. Les différences culturelles sont la barrière à l'internationalisation la plus fréquemment mentionnée. Elles qui nécessitent une communication prudente et peuvent conduire à prolonger ou même à faire échouer les négociations, et engendrer difficultés de gestion à distance.

Les PME étudiées utilisent de nombreuses **mesures de soutien public** pour internationaliser leurs activités d'innovation. La plus visible était la participation à des projets de recherche européens mais aussi nationaux. Ceci était en partie dû à une sélection d'entreprises identifiées au moyen de programmes européens. Quelques PME ont utilisé des programmes nationaux de promotion et des missions commerciales. Dans de nombreux cas, les PME ont développé leur activité internationale de manière assez simple via les chambres de commerce, les salons professionnels internationaux ainsi que les ambassades nationales.

Toutes les PME étudiées signalent les **impacts positifs de l'internationalisation** de leurs activités d'innovation. L'internationalisation a permis de soutenir, de développer l'activité et d'améliorer la qualité des produits, des services et des relations avec les clients.

Analyse FFPM

Le chapitre quatre classe les mesures politiques existantes de l'UE soutenant l'internationalisation. Pour chaque mesure politique, l'équipe chargée de l'étude indique si elle se concentre principalement sur les exportations et le commerce, la production internationale et/ou la R&D et l'innovation internationales. Nous utilisons l'évaluation, faite par la Commission européenne, des instruments de l'UE contribuant à l'internationalisation des entreprises européennes comme point de départ à notre propre inventaire des instruments de l'UE et nous l'associons aux idées provenant de la recherche documentaire. Il en résulte un aperçu des mesures politiques soutenant l'internationalisation de l'innovation des PME. Les mesures politiques les plus importantes concernant l'internationalisation de l'innovation des PME peuvent être regroupées sous quelques programmes politiques de la Commission européenne. COSME, l'ancien ICI & ICI+ qui est à présent remplacé par le Partnership Instrument et Horizon 2020.

Avant d'évaluer les mesures politiques de l'UE, nous avons décrit un certain nombre de meilleures pratiques au niveau national :

Qualification du cas, pays	Pratique exemplaire
Coopération commerciale pour l'innovation internationale (Espagne)	Par le biais de l'internationalisation, les entreprises améliorent la coopération, la gestion et l'investissement dans la R&D et l'innovation.
Compétition pour les start-ups Get in the Ring (Pays-Bas)	Promeut une orientation internationale parmi les entrepreneurs de PME, valorise une communauté mondiale de 20 000 entrepreneurs qui peuvent résoudre des défis mondiaux.
Réseau Hesse-Chine (Allemagne)	L'une des initiatives de collaboration les plus réussies dans le domaine de la recherche. Elle a favorisé et renforcé les relations commerciales, culturelles et scientifiques entre l'Europe et la Chine.
Contrats de recherche et de développement industriels	Le programme accorde des subventions aux projets de R&D, dans lesquels un fournisseur PME fait équipe avec un gros client exigeant, de préférence

(Norvège)	international.
Service de coordination partenaire (Israël)	Utilise la diaspora mondiale des entrepreneurs israéliens pour connecter les PME et les grandes entreprises dans le monde entier et mettre en place des programmes bilatéraux pour les entreprises industrielles collaboratives de R&D.
Mobilité pour la croissance (Suède)	Mécanisme de financement de la mobilité transnationale entrante et sortante pour les chercheurs expérimentés qui promeuvent la collaboration internationale active entre les organisations impliquées.
Les femmes dans le commerce international (Australie)	Programme national (notamment le parrainage) pour aider les femmes d'affaires à internationaliser leurs produits et leurs services.
Centres scientifiques et technologiques (S&T) (Inde)	Centres S&T bilatéraux qui utilisent divers modes de coopération et ont une gamme élargie d'activités.

L'une des **forces** importantes du portefeuille actuel de mesures de soutien est qu'il couvre un large éventail de mesures politiques d'aide à l'internationalisation des PME et les différents types d'activités internationales des entreprises. En général, ces mesures politiques semblent avoir un effet positif sur la probabilité des entreprises de coopérer avec des partenaires dans d'autres pays (européens), stimulant ainsi les flux de connaissances à travers la coopération et l'innovation. Elles permettent non seulement aux entreprises d'avoir une (première) expérience de coopération mais elles augmentent aussi la probabilité de poursuivre la collaboration dans le temps. Les programmes de soutien publics pour les projets collaboratifs de R&D offrent une opportunité importante, particulièrement lorsqu'il est risqué de mettre en œuvre des alliances stratégiques plus complexes. C'est surtout le cas des PME qui n'auraient autrement pas conclu un accord de coopération.

D'un autre côté, le manque de promotion cohérente de la recherche de l'innovation à travers les différents programmes de l'UE et les mesures pour l'internationalisation peuvent être une **faiblesse**. En ce moment, la plupart des mesures d'internationalisation visent la promotion des exportations, et dans une certaine mesure aussi la promotion de la production dans des pays étrangers (par exemple, via l'investissement étranger direct) mais plus rarement la promotion de la recherche de l'innovation. Cela signifie que la contribution de la recherche et de l'innovation aux objectifs politiques de l'UE tels que la compétitivité et la croissance des PME ou le fait de favoriser la stabilité économique dans des nations partenaires est actuellement limitée. Deuxièmement, de nombreuses PME, notamment les PME innovantes, luttent contre la complexité des différents programmes de l'UE et contre la fragmentation du large portefeuille d'instruments politiques. Cela s'applique également aux instruments disponibles aux niveaux national, régional et parfois local. Troisièmement, la coordination et les activités de soutien de l'UE sont souvent plutôt de nature génériques et pourraient mieux respecter les caractéristiques des groupes cibles spécifiques, c'est-à-dire les PME innovantes qui partagent une base de savoir spécifique. Travailler sur une base spécifique au secteur ou à la technologie ou les deux pourrait être un moyen de régler ce problème.

Malgré les forces apparentes, il existe encore de nombreuses **opportunités** pour améliorer le portefeuille actuel d'instruments politiques. Les programmes existants pour la collaboration en matière de recherche semblent être de bons points de départ pour que les PME innovantes construisent des réseaux internationaux. Elles pourraient utiliser les réseaux de leurs partenaires pour accéder à des partenaires ou à des clients en dehors de l'Europe. Une autre opportunité consiste à adapter les programmes existants génériques d'exportation et de promotion commerciale aux besoins spécifiques des PME innovantes, par ex., en incluant des éléments de personnalisation ou de soutien aux Droits de Propriété Intellectuelle. Il existe également plusieurs opportunités pour promouvoir l'internationalisation de l'innovation via l'amélioration de conditions préalables plus larges, notamment l'amélioration des performances commerciales générales des PME (par ex., améliorant les compétences de gestion) et en favorisant une orientation internationale parmi les entrepreneurs de PME.

Les **menaces** pertinentes sont les suivantes : Premièrement, de nombreux systèmes d'innovation des états membres, eu égard aux finances publiques de R&D, s'appuient de plus en plus sur le financement public de l'UE. L'émergence de la Chine en tant que force scientifique mondiale et la poursuite de son expansion dans les services à valeur accrue, notamment les services Internet mondiaux et la fabrication, représentent une deuxième menace.

Implications politiques

Les gouvernements devraient baser la conception des mesures politiques sur une preuve empirique et les mesures devraient découler de défis concrets auxquels les PME innovantes font face lorsqu'elles s'internationalisent. L'étude a identifié quatre défis principaux relatifs à l'innovation à l'international : rester à un niveau très élevé de développement technologique international et des connaissances ; établir des contacts avec les pays étrangers ; traiter avec les cultures étrangères ; traiter avec la politique gouvernementale, notamment la réglementation.

Concernant les **connaissances**, les projets de recherche et de développement européens jouent apparemment un rôle vital, non seulement pour repousser les frontières technologiques mais aussi pour étendre les réseaux internationaux des partenaires d'innovation. Les études de cas et l'analyse FFPM ne suggèrent aucune révision spécifique des projets de recherche et d'innovation européens concernant leur dimension internationale. Cependant, l'analyse FFPM suggère de simplifier la participation des PME aux programmes européens et d'aligner les programmes nationaux et européens, parce que les PME perçoivent les programmes européens comme étant trop complexes. De plus, il est recommandé aux PME de se méfier des grandes entreprises nombreuses afin de bien représenter leurs intérêts. La gestion attentive du réseau peut également être nécessaire pour passer des petits projets à de grands projets et au consortium.

Concernant les **contacts** internationaux, les études de cas suggèrent que les gouvernements et les agences gouvernementales soutiennent la recherche de contacts, par exemple à travers des agences spécifiques, des missions commerciales et des points de contact locaux dans les pays étrangers. L'aide via les institutions conventionnelles comme les chambres de commerce et les ambassades nationales semblent suffire dans de nombreux cas. Cependant, les mesures commerciales d'exportation pourraient élargir leur champ d'action ; elles pourraient être adaptées aux besoins spécifiques des PME innovantes. Par exemple, dans les missions commerciales : Les missions commerciales axées sur l'innovation pourraient se concentrer sur les premières étapes de développement du produit, plutôt que sur les phases de commercialisation ultérieures, cibler les partenaires éventuels pour la collaboration R&D&I plutôt que les clients, et être ciblées sur un certain secteur ou une certaine technologie.

Tandis que l'étude a identifié des **cultures** étrangères comme étant un problème fréquent pour l'internationalisation des activités d'innovation des PME, la plupart des PME étudiées se sont révélées capables de gérer les problèmes afférents sans soutien supplémentaire. Les PME doivent prendre les cultures telles qu'elles sont, parce qu'elles n'ont pas le pouvoir ou les ressources pour tenter d'influencer le comportement et le mode de pensée des interlocuteurs étrangers. Cependant, les agences publiques, les chambres de commerce et les ambassades peuvent être utiles pour interagir avec les partenaires commerciaux de cultures étrangères. Dans un sens plus large, les mesures politiques pourraient accorder plus d'attention à la promotion de l'orientation internationale parmi les entrepreneurs.

Alors que l'étude a identifié peu de besoins en politiques **gouvernementales** nouvelles **spécifiques** ou améliorées pour soutenir l'internationalisation des PME innovantes, le besoin consiste peut-être plutôt à concevoir des politiques et une réglementation générales plus favorables aux entreprises. Les entreprises qui vont à l'étranger doivent se conformer aux normes légales qui peuvent différer d'un pays à l'autre, même en Europe et la réglementation peut entraver les affaires. Il y a aussi peut-être des politiques de sauvegarde gouvernementale défavorables et des types spécifiques de protectionnisme. Il peut-être conseillé à la Commission européenne de chercher encore à harmoniser la réglementation en Europe pour les marchés

spécifiques tels que le marché secondaire pour les tickets d'événements. Dans d'autres secteurs, tels que la biotechnologie agricole, la réglementation doit peut-être être mise en œuvre plus rapidement pour fournir un environnement réglementaire clair.

En général, il peut être recommandé à la Commission européenne de **concevoir des mesures de soutien politique visant conjointement l'internationalisation et l'innovation** parce que la recherche suggère la corrélation entre les deux. Malgré les forces apparentes, il existe encore de nombreuses possibilités pour améliorer le portefeuille actuel d'instruments politiques. Les instruments politiques qui sont axés sur l'internationalisation peuvent également être utilisés pour stimuler l'innovation et les mesures politiques qui sont axées sur la recherche et l'innovation peuvent, elles aussi, viser l'internationalisation. Il est également possible d'améliorer la coordination entre ces deux éléments. Enfin, il existe plusieurs instruments politiques génériques qui peuvent potentiellement améliorer les conditions préalables de l'internationalisation de l'innovation, par ex. concernant les ressources humaines et l'entreprenariat.

1 BACKGROUND: WHY INTERNATIONALISATION OF SME INNOVATION IS IMPORTANT

The European Commission considers internationalisation of SMEs' innovation activities as important for the European economy. It is important mainly for three reasons, as identified by a study on behalf of DG Enterprise and Industry in 2010 (EIM 2010):

- Internationally active SMEs were found to create more jobs. From 2007 to 2008 they reported employment growth of 7% versus only 1% in SMEs without international activities.[2]
- International SMEs were found to be more profitable and more inclined to grow: 50% of internationally active SMEs reported an increasing turnover from 2007 to 2008, while the share for all SMEs was only 35%.
- Internationally active SMEs were found to innovate more intensely: 26% of them introduced products or services new to their sector in their country; for other SMEs the share was only 8%.

However, **official statistics** show that only a minority of European companies engages in international activities. Eurostat's seventh survey on community innovation showed that only one in nine companies which introduced innovative products or processes were co-operating with European partners. The share was even smaller when considering partners in another continent.

The European Commission considers this small share as "harmful to the potential of European SMEs to conquer a share of the market on these other continents or to benefit from co-creation with partners from these economies" (European Commission, DG RTD 2015, p. 6). The Commission is concerned because much of the world's economic growth in the forthcoming decades is expected to be generated in emerging and **developing economies**, China and India in particular. These countries have also progressively strengthened their research and innovation systems. The Commission sees a strong need for European SMEs to participate in new value chains and innovate with partners in emerging or developing economies.

The Commission acknowledges, however, that there are many **barriers** to internationalising innovation activities.[3] Going abroad can be a risky and costly venture. SMEs are facing issues related to protecting intellectual property rights, trade regulation, and insufficient availability of specialised human capital. The situation in certain foreign economies, markets or political institutions may be challenging and there are issues related to distance, language, and culture. Dealing with this usually requires substantial efforts in terms of time, money, effort, and people. SMEs may not have the scale, resources and buffers which larger enterprises have. There are also internal reasons like small firm size, difficult access to (human) resources, lack of skills, and ill-adapted service, product or process portfolios. There may also be inadequate public support to ameliorate these difficulties, which may also be due to wide fragmentation of authorities within the EU.

Research on possible policy options for tackling these barriers suggests that there is **no one-size-fits-all solution** to address them all. The solution may rather be in tailor-made public policy support approaches for SMEs in certain countries or industry sectors.

Hence, the Commission launched a range of **actions** supporting SME innovation and internationalisation under Horizon 2020, in particular under the specific objective "Innovation in SMEs". These actions explore the desirability, necessity and feasibility of policy measures that are coherent and efficient at an EU-level. The Commission seeks helping European SMEs to close the

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[2] See EIM (2010), p. 55, including SMEs planning or not planning international activities.

[3] See EIM (2010), pp. 57 – 62.

innovation gap with large multinational enterprises, which by definition are much more able to engage in internationalisation activities.

Against this background, the **objective of the study** and this report is threefold: Firstly, providing deeper and broader insights about the drivers, barriers and practices of European SMEs which internationalised their innovation activities. Secondly, analysing policy support measures and infrastructures related to internationalising SMEs' innovation activities. Thirdly, deriving implications for governmental policies in order to develop more effective and efficient policy measures.

This report first presents an overview about the state of the art of research on internationalisation in SMEs (Chapter 2). It continues with twelve case studies about SMEs' and the internationalisation of their innovation activities (Chapter 3). In Chapter 4 it presents an analysis of strengths, weaknesses, opportunities and threats (SWOT analysis) of measures seeking to support SMEs' international innovation activities. Finally, there are conclusions for policy implications in Chapter 5.

Beyond case study research and SWOT analysis, the study team used the following methods:

- Interviews with three experts from different SME domains (academia, business association, policy); see Annex 3.
- An online survey of experts in the field of innovative SMEs conducted externally by Salzburg Research (see Selhofer 2016).
- An expert workshop in Brussels on 13 June 2016 for validating the study's preliminary findings.[4]

[4] See the agenda and a summary at http://ri-policy-analysis.eu/studies/internationalisation-of-innovation-in-smes and at https://secure.salzburgresearch.at/dl/?t=5fe2679290f0929b24cc4e133e92fb52.

2 STATE OF THE ART OF RELATED RESEARCH

2.1 Key definitions

At the outset of the study, a definition of the terms of "innovation" and "internationalisation" is essential.

Innovation, as defined in the Tender Specifications (p. 5) and as conceived in the Innovation Union plan,[5] means "change that speeds up and improves the way we conceive, develop, produce and access new products, industrial processes and services, ultimately leading to value creation from novelty".

It is our understanding that innovations comprise novelties in marketed goods (output, i.e. products and services), processes (methods e.g. for production, procurement, marketing, finance), and organisation (organisational set-up and decision-making within an organisation). This definition is largely in line with the definition of innovation used by the OECD and Eurostat, while subsuming marketing methods as another type of "business process".

Internationalisation of innovation in SMEs means interacting with another country in the SME's activities for introducing new products and services, processes, and inputs to the market. Such internationalisation of innovation activities may take place in the following ways:

a) **Branch** type – establishing subsidiaries in foreign countries for innovative purposes. This may for example include conducting R&D as well as producing or marketing innovative products and services there.

b) **Collaboration** type – innovation involving a foreign partner: Engaging in co-operation with an international partner in order to jointly or sequentially conduct research, development or innovation activities. Such co-operation can take a variety of types and levels of interaction, "ranging from simple one-way information flows to highly interactive and formal arrangements" (OECD 2013, p. 128). Prominent examples of formal arrangements include joint R&D as well as marketing and sales of innovative products via agencies in foreign countries.

c) **Customising** type – accessing foreign markets with innovative products or services tailor-made to the target market (or even to a target customer) in a foreign country without necessarily having a foreign partner: Innovating with the particular intention to gain access to or better compete on a foreign market. This is a specific type of export. Customisation is essential for this type – such internationalisation is not the mere expansion of the geographical area for selling the same innovative goods or processes in the same way. This type may also imply that the SME continues selling the same goods as before but introduces a customised method of marketing it.

d) **IP purchase** type – increasing an SME's competitiveness through acquiring intellectual property from a foreign country.[6]

e) **Employment** type – hiring staff from other countries for strengthening the enterprise's innovation activities. This includes for example hiring researchers and innovation managers from abroad.

These types can be distinguished for definitional purposes but in practice they may frequently overlap.

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[5] See http://europa.eu/rapid/press-release_MEMO-10-473_en.htm?locale=en.

[6] See the OECD statistics about cross-border ownership of patents in the OECD Science and Innovation Scoreboard, OECD (2013), p. 65.

2.2 A literature review

An overview about findings from literature

At the beginning of the study, the study team carried out a research for literature about internationalisation of innovation in SMEs. Some further literature was identified in the course of the study. Three types of literature were considered: (1) studies on behalf of the European Commission, (2) academic publications, and (3) other literature such as websites and publications by various kinds of governmental or industrial organisations. All in all, there is not much literature available about the specific subject of this study.

Studies on behalf of the European Commission

The study about "internationalisation of innovation in SMEs" for which this report is written is just the latest in a series of studies dealing with SME internationalisation on behalf of the European Commission. Previous studies include the following, in chronological order.[7] The study at hand is, however, the first one focussing on innovation activities within internationalisation.

Study on performance of SMEs within FP7 (2014)

This study is an interim evaluation of two SME-related programmes within the European Commission's seventh Framework Programme (FP7): the Cooperation Programme and the Research for the Benefit of SMEs (RSME) schemes. The study found two particular benefits of the "international dimension" of FP7 projects with regard to "European added value": access to competencies as well as access to markets and business partners. "For many SMEs, the geographical scope is a unique chance for knowledge transfer out of the ordinary" and "several projects refer to access to extra-European markets, such as Brazil, China or Taiwan". See Panteia et al. (2014), p. 92.

Study on Business Networks (2014)

This study investigated emerging forms of inter-firm collaboration. The aim was to propose possible measures to support business networks and co-ordinate them at the European level when appropriate. Based on eight case studies conducted in EU countries, business networks were divided into two types: business associations and company aggregations. The difference between the two types is in the level of co-operation and co-ordination. See Ecorys (2014).

Study on Support Services for SMEs in International Business (2013)

This mapping-study assessed the scope and availability of support services for SMEs in the EU and in 25 countries outside the EU. The study resulted in an inventory of support measures[8] and an analysis of gaps and overlaps in existing services in order to identify the need for future action. It found that there is an abundance of support services for SMEs in all countries covered but hardly any focus on specific types of SMEs in terms of size, age, and sector (ECSIP 2013, p. 13).

Study on internationalisation opportunities for European SMEs in third countries (2011)

This study looked at opportunities and support available for EU SMEs to do business outside the EU, particularly in the key markets of Brazil, Russia, India, China, Japan, South Korea, and Ukraine. The study found that "very few support measures are properly evaluated" (EIM 2011, p. 7) and that "there appears to be a need to better coordinate existing support rather than to introduce new types of support service" (EIM 2011, p. 8).

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[7] See the overview at http://ec.europa.eu/growth/smes/access-to markets/internationalisation/studies/index_en.htm.

[8] For an overview of support measures at EU level, see the "Overview of EU instruments contributing to the internationalisation of European enterprises" in European Commission (2015).

Study on the level of internationalisation of European SMEs (2010)

The study was launched to identify the main barriers and advantages of internationalisation, and to propose policy recommendations. It analysed all activities that put SMEs into a business relationship with a foreign partner: exports, imports, foreign direct investment, international subcontracting, and international technical co-operation. The study also included a section about internationalisation of innovation, finding "a strong link between activities on international markets and different forms of innovation" with apparent causal effects in both directions (EIM 2010, p. 10). In addition to figures on SMEs' internationalisation, the study concludes that there is a need to enhance support for greater internationalisation.

Expert Group Report on "Supporting the internationalisation of SMEs" (2007)

The European Commission launched this project in order to understand the barriers impeding greater SME involvement in international operations and identify successful practices. The final report from the expert group stated that Government support remains vital for SMEs' internationalisation. Developing a successful related strategy should, among other issues, assure "participation of all direct stakeholders in developing both policies and programmes: national and regional governments, business associations, business support associations and banks" (EC 2007, p. 4). It called for policies to "focus on the main barriers to SME internationalisation: lack of financial resources, lack of skills and lack of information" (EC 2007, p. 5). Other barriers include distance (making it difficult to supervise the process and exchange information); maintaining relationships; cultural differences, language and mind-set; finding the right partners (trust-based networks); and establishing distribution channels (e.g. finding a local sales person). These statements may still be true today and also apply to the specific issue of internationalising SMEs' innovation activities.

Academic publications

At the beginning of this study, academic publications were searched for, including journal articles and books as well as working papers about internationalisation of innovation in SMEs. Two strands of literature were found to be relevant: entrepreneurship and small business as well as management and marketing. See Annex 1 for details about the search in academic journals.

Literature research for this study found that there is a broad range of literature dealing with both internationalisation and innovation in SMEs or either of them in some way. However, all in all academic literature turned out to be of limited usefulness. Firstly, few publications deal with the issues at stake in a way relevant for this study, i.e. analysing practices, drivers, barriers, and success factors of internationalising innovation. In fact, not a single article or book was deemed to be at the core of the subject of this study. In any case, there are some academic publications that give at least some insights. They will be used in the analyses in parts 3 and 4 of this report.

Secondly, the focus of the identified articles in the field of entrepreneurship and small business is more **abstract rather than on concrete practices**, while the latter is the approach taken in this study. Thirdly, the general theme in this strand of research considers either internationalisation or innovation and is not so often found to comment on their interrelationship.[9] Furthermore, most articles which deal with internationalisation focus on related strategies, particularly through exports and international market entry. However, the way internationalisation is dealt with in this study does not necessarily imply exports. For example, SMEs may co-operate with research organisations in other countries or purchase intellectual property from there without necessarily exporting to these countries.

[9] For example, the following articles deal with both internationalisation and innovation: Dai et al. (2014), Jones et al. (2011), Partanen et al. (2011), Acs/Terjesen (2013), Spithoven et al. (2013), Pérez/Rodriguez (2012), Lee at al. (2012).

Articles in marketing and management journals were found to be more insightful for this study. Most of the relevant articles present a mix between cross-sectional case studies or case studies built around a success story of a single country or industry; analyses based on data obtained from national and international trade surveys; and in some cases, econometric analyses. Very few studies dealt with policy measures. The evidence presented in such studies was to a great extent circumstantial and did not provide many gainful insights for this study. However, among all studies there was a theoretical and empirical **consensus that internationalisation is beneficial** for the long-term growth and survival of SMEs.

There are some noteworthy publications that provide insights into the combination of internationalisation and innovation in SMEs. Concerning strategies to commercialise innovation, Partanen, Cheety and Rajala (2014) conducted a case study analysis of four small Finnish firms to analyse the effect of network relationships on small, new innovative firms seeking to internationalise innovation. They ultimately conclude that since small firms are resource scarce, networks have increasingly important implications for the firms' survival and growth. Concerning policy implications, Altomonte et al (2013) in a cross-country study of manufacturing firms across seven European countries (Austria, France, Germany, Italy, UK, Hungary and Spain) looked at different factors attributing to the framework of innovation policy in OECD countries. The authors determined distinct types of innovation policy implementation instruments used in OECD countries and their relative successes and weaknesses over a period of years ranging from 1988 – 2007. Additionally, they suggested a causal relationship between innovation and internationalisation and established that **sustainable internationalisation goes beyond exports and is driven by innovation**.

Recently, special attention has been paid to the so-called "**born global firms**" (see e.g. Tanev, 2012). However, these firms hardly ever really start international activities from scratch. First, they are usually founded by entrepreneurs who already have international experience. Second, they often operate on existing global platforms, e.g., internet market places. Thus, although born global firms are a real empirical phenomenon, they are a rather small and special subcategory based on preconditions which common SMEs do not comply with.

Policy and business papers

The study team also used information from governmental organisations such as the OECD (Science, Technology and Industry Scoreboards) and business associations. As regards two of the largest European business associations, Businesseurope produced seven publications dedicated to SME internationalisation between 2011 and 2015,[10] and the European Association of Craft, Small and Medium-Sized Enterprises (UEAPME) two.[11] This indicates the importance of the subject. Businesseurope acknowledges that "inside and outside the EU, there are more than 1200 public and private services supporting the internationalization of European SMEs" but is concerned that "there are gaps in the service offer and missed opportunities for synergy between players".[12] UEAPME points out that "there is especially a need for information and training about the markets in general, and then also concerning the provision of services, customs, export regulations, standards and legal support especially in the field of contract law.[13]

[10] See https://www.businesseurope.eu/policies/smes-and-entrepreneurship/sme-internationalisation#topic-publications for BusinessEurope publications about SME internationalisation.

[11] See http://www.ueapme.com/spip.php?rubrique65.

[12] BusinessEurope (2014), p. 8

[13] UEAPME (2011), p. 2.

2.3 The statistical picture

Overview about statistical sources

There are only a few sources helping to draw a statistical picture about internationalisation of innovation in SMEs. These sources differ by SMEs sampled, data collection method, countries covered, definitions of internationalisation, and the time when the survey took place. It is thus difficult to compare findings from these studies. The most valuable sources found were a Flash Eurobarometer 2015, a study on behalf of the European Commission by EIM 2010, Eurostat's Community Innovation Survey, and the OECD. Most important findings from these sources are presented in the following.

Flash Eurobarometer (TNS Political & Social) 2015

A recent source of quantitative data about internationalisation of innovation in SMEs is Flash Eurobarometer 421 "Internationalisation of Small and Medium-Sized Enterprises".[14] The report shows that imports and exports are the far most frequently applied ways to go international. Using a subcontractor based abroad and working as a subcontractor for a company based abroad follow behind. Working with a partner based abroad for R&D purposes is even less frequent,[15] and investing in a company based abroad was found to be least frequent. For all indicators except foreign investment, the values for activities inside the EU are higher than outside the EU. For foreign investment the values are equal. Furthermore, international activity is rather a minority phenomenon: Almost half (48%) of the surveyed SMEs reported no international activity within the EU and approximately two thirds (69%) no international activity outside the EU in the past three years. See Exhibit 2-1 for the findings.

Among those SMEs that export, "administrative procedures are too complicated" was the most frequently mentioned **barrier** (24% "major problem", 28% "minor problem"). This also applies to SMEs only exporting to the internal market. The following items are high delivery costs (21% / 28%), difficult identification of business partners (19% / 26%), and too large financial investment (20% / 22%). On the other end of the scale, lacking language skills (8% / 20%) and products or services being specific to the home market (6% / 13 %) were not found to be a big problem. Those SMEs that do not export indicate that large financial investments would be the biggest problem (37% / 17%), followed by expensive resolving of cross-border complaints and disputes (36% / 15%), and identification of business partners abroad (28% / 21%). The Eurobarometer survey did not include a question about cultural barriers.

As regards **policy support** to engage in international business, most SMEs favoured "grants, subsidies or low interest loans" (30%). This is in line with the finding that those SMEs that do not export perceive large investments as the biggest problem for engaging in business abroad. Further desired support measures include tax incentives (28%) and support for finding business partners and networking (27%). The other options follow behind, with "advice or training" being favoured least (17%). Quite a large share of SMEs spontaneously said "none" (25%). Exhibit 2-2 shows the

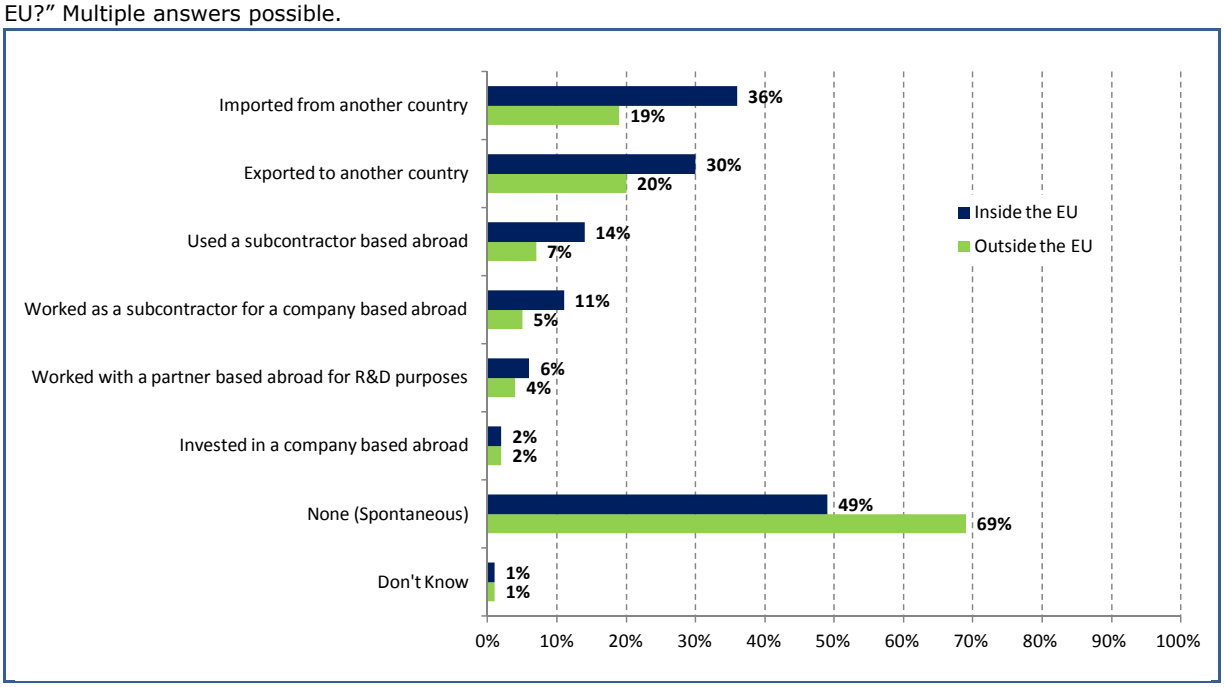
[14] See TNS Political and Social (2015). This survey was conducted on behalf of the European Commission. It was carried out in the 28 EU countries and in the six non-EU countries that are part of the COSME programme between 10 and 30 June 2015. 14,513 SMEs were interviewed via telephone. The survey also included micro enterprises (at least three quarters of SMEs in this survey) and included all sectors (most of the SMEs are operating in retail or other service sectors).

[15] The study team believes that even these small figures are overstated. In the Netherlands, there are 1.4 million SMEs (CBS Statistics, 2015). The WBSO, a low profile R&D tax credit scheme of the Dutch Ministry of Economic Affairs, is intended to provide entrepreneurs an incentive to invest in research. In total roughly 22,000 SMEs received tax benefit based on this scheme (RVO, 2014). This is only 1.6% of all SMEs. Since one can assume that almost all companies that perform R&D take part in this tax credit scheme, it is conspicuous that almost twice that much Dutch SMEs (3% according to Eurobarometer) should perform at least some R&D outside the EU.

values for all items. The survey also included a question about whether the SMEs know the Enterprise Europe Network (EEN) which can help establish international business activities. However, only 8% of the SMEs knew the EEN.

Exhibit 2-1: SMEs' international activities according to Flash Eurobarometer 421 (2015)

Question: „In the last three years, has your company done any of the following activities inside/outside the EU?" Multiple answers possible.

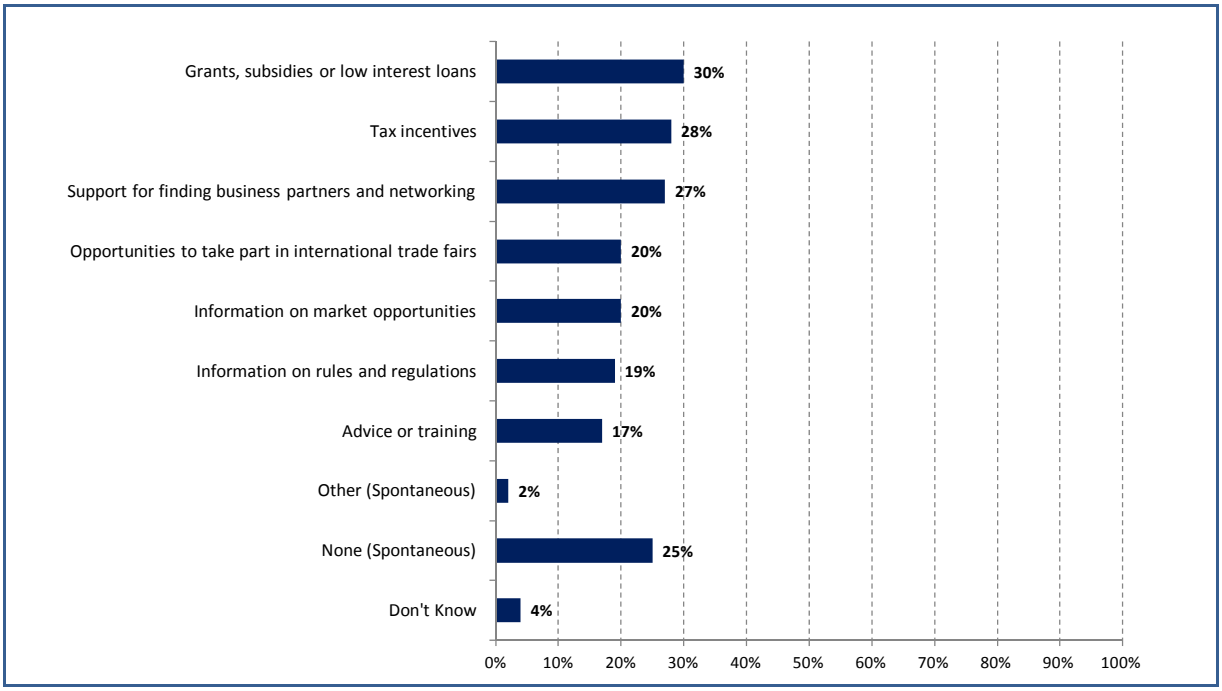


Base: n = 13,111 SMEs based in the EU.

Source: TNS Political & Social (2015), p. 21 for inside the EU and p. 28 for outside the EU

Exhibit 2-2: SMEs' preferred policy measures for engaging in business abroad

Question: „Which of the following measures would help your company most to engage in business abroad?" max. three answers.



Base: n = 13,111 SMEs based in the EU.

Source: TNS Political & Social (2015), p. 102

EIM (2010)

Another detailed source for internationalisation of innovation in SMEs is the 2010 report to the European Commission's Directorate-General Enterprise and Industry about the level of internationalisation of European SMEs. The data and conclusions were based on a survey of 9,480 SMEs from all size-classes and ages in 33 European countries[16] and 26 industry sectors. GDCC, Netherlands, collected the data in spring 2009,[17] by way of computer-aided telephone interviews. Since this was a time of economic distress for many countries and enterprises, reported international activity might have been smaller than in other times.[18] The study distinguished six types of international interaction: (1) exports, (2) imports, (3) foreign investment, (4) technological co-operation with enterprises abroad, (5) subcontracting to a foreign main contractor, and (6) having foreign subcontractors. All types relate to the three years before the survey. As far as internationalisation in general is concerned, the study found the following:

- Overall: 44% of SMEs had at least one of the six types of internationalisation. (EIM 2010, p. 17.)
- Size classes: The share of enterprises with international activities was found to be highest in medium-sized enterprises (73%), lower in small enterprises (58%) and lowest in micro enterprises (43%). This ranking also applies to all six types of internationalisation.
- Age classes: The percentage of SMEs importing and exporting steadily increases with the age of the firm. However, for foreign investments, being a subcontractor or having a foreign subcontractor, enterprises that are between 5 to 9 years old show the highest incidence. (EIM 2010, p. 20.)
- Countries: The smaller the country, the larger the share of SMEs with international activities. (EIM 2010, p. 6.)
- Types: Imports (30% of SMEs) and exports (26%) were by far the most prevalent types of international activities; all other types were below 10% of SMEs.
- Partner countries were mostly from the EU, except for imports from China. For exports, imports and subcontracting, approximately half of the SMEs reporting these international activities were active outside the EU.19
- The industry sectors with the highest percentage of internationally active SMEs were found to be wholesale trade, mining, manufacturing, sale of motor vehicles, and research services (EIM 2010, p. 26).

Furthermore, the study found the following about international innovation activities:

- There is a strong link between activities on international markets and different forms of innovation. 26% of internationally active SMEs introduced products or services that were new for their sector in their country, for other SMEs this is only 8%. (EIM 2010, p. 48.) This may also mean but does not necessarily mean that the innovative SMEs introduced new products and services to the foreign market, which would qualify as "internationalised innovation activity" as defined in this study.
- Having the possibility to sell products or services online, i.e. e-commerce sales which may be considered as a type of process innovation, is positively correlated with being active in export or import markets (EIM 2010, p. 46).

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[16] Beyond EU-28: Iceland, Liechtenstein, FYR of Macedonia, Norway, and Turkey.

[17] See EIM (2010), p. 79.

[18] See EIM (2010), p. 13.

[19] See EIM (2010), p. 15. For the other types, data cannot be broken down this way.

- 7% of SMEs within the EU-27 were involved in technological co-operation with a foreign partner.

However, the study did not distinguish between activities inside and outside the EU. Moreover, since the study did not define "technological co-operation" it remains unclear to what extent such co-operation may be related to innovation. Technological co-operation may in any case involve joint R&D which is a major form of international innovation activities.

Eurostat Community Innovation Survey

The Community Innovation Survey (CIS) provides statistics by types of innovators, economic activities and size classes. Currently, Eurostat carries out the survey every two years across the EU, some EFTA countries and some EU candidate countries.[20] Most recent data available at the time of writing this report were from 2012. Two CIS questions are particularly relevant for this study: question 6.3 about international innovation co-operation partners, and question 11.2 about the importance of certain strategies for reaching the enterprise's goals.

Types of co-operation partners

The 2012 CIS questionnaire included a question set about the "type of innovation co-operation partner by location". In principle, this question block may offer important insights for this study. However, the actually available data from the CIS are limited: Data are available for most countries but not for the whole of EU28; Data are not available for micro enterprises; Data are not available by specific types of co-operation partners. Furthermore, data are only available as a share of product- or process-innovative enterprises. However, some findings from the CIS 2012 may nevertheless be worthwhile mentioning:[21]

- Co-operation with innovation partners in Europe beyond the own country is limited and **co-operation with innovation partners beyond Europe is very limited**. The share of small enterprises (10 – 49 employees) co-operating with any type of innovation partner within Europe varies between 10.9% in Italy and 50% in Cyprus. For co-operation with India or China, percentages vary between 0 in Luxembourg and Romania and 4.9% in Lithuania. For co-operation with the US, the values vary between 0.1% in Italy and 8.6% for the Netherlands. For any other countries, the percentage is lowest in Romania (0%) and highest in Cyprus (9.3%).
- The level of **co-operation with innovation partners outside the own country is higher in larger enterprises** than in SMEs. For example, the share of large enterprises (more than 249 employees) co-operating with any type of innovation partner in Europe varies between 33% in Malta and 73% in Slovenia and Greece. For co-operation with India or China, percentages vary between 0% in Malta and 25% in Denmark. For co-operation with the US, the lowest percentage is 4.2% (Malta) and the largest 32% (Finland). For any other countries, the lowest share of large enterprises co-operating with innovation partners is 0 in Malta and 31% in the United Kingdom.

These findings are in line with findings from the EIM (2010) survey. The complete CIS findings are included in Annex 1, part 1.

Importance of certain strategies for reaching the enterprise's goals

The CIS 2012 also included a question about the enterprise's strategies for reaching its goals. The pre-defined answers included one about "developing new markets outside Europe". The enterprises could assess the importance of the goals as high, medium, low or not relevant. Again, data are only available for certain countries (21 countries) and not for micro enterprises, and data are only

[20] See http://ec.europa.eu/eurostat/c/portal/layout?p_l_id=203678&p_v_l_s_g_id=0.

[21] Figures cannot be compared with those from TNS (2015) because the Flash Eurobarometer also included micro enterprises.

available for answers indicating high importance or "not relevant". The following percentages relate to innovative enterprises, including enterprises with abandoned, suspended or on-going innovation activities:

- Only a minority of innovative small enterprises (10 – 49 employees) find it very important to develop markets outside their home country.
- Innovative small enterprises find it **more important to develop new markets inside Europe than outside**. The share of innovative small enterprises that consider developing new markets within Europe highly important was found to vary between 8% in Sweden and 44% in Hungary. For developing new markets outside Europe, the variation is between 8 % in Slovakia and 28% in Portugal.
- In very few European countries, Cyprus and Romania, innovative small enterprises tend to be looking slightly more outside Europe than inside. However, the share of innovative enterprises seeking to develop markets outside their country was low in both cases. Among large innovative enterprises, there are more countries where markets beyond Europe are considered more important than European markets.

The complete CIS findings are included in Annex 1, part 2.

OECD

The OECD Science, Technology and Industry Scoreboard (STI) provides data on internationalisation of innovation. However, the data is only available by country, and not for enterprises of different size classes. The following trends taken from the OECD STIs 2013 and 2015 are particularly relevant here, related to scientific collaboration and knowledge ownership:

- **Knowledge is increasingly created in cross-country collaborations**, and increasingly owned and used in a different country from the one in which it was developed. In order to use knowledge and inventions of others, enterprises can acquire intellectual property rights (IPR), e.g. patents. There is also a general trend of international co-invention of patents. (OECD 2015, p. 138, and OECD 2013, p. 140.)
- The rate of **collaboration** with international innovation partners **varies widely across countries**. In some small countries such "collaboration is heavily skewed towards foreign partners", a circumstance which reflects factors such as sectoral specialisation and limited opportunities for domestic collaboration (OECD, p. 128).
- Scientific **collaboration with BRIICS countries has increased very little in Europe** from 2001 to 2011, while such collaboration increased in North America and the Far East. (OECD 2013, p. 66.)
- Collaboration with international partners is **more prevalent in large enterprises** than in SMEs. (OECD 2013, p. 128.)
- The level of international **collaboration** of inventors **differs by technology field**. In organic chemistry, international co-inventions account for 16% of patented innovations, whereas it is only 4% in optics. (OECD 2015, p. 139.)

2.4 Relevant theoretical approaches and their usefulness for this study

On the importance of a theoretical foundation for innovation policy

For contextualising case studies and for formulating policy implications in this study, it is helpful to reflect on theoretical insights. If policy makers seek to implement effective and efficient policies for internationalising SME innovation, such policies should be in accordance with principal insights of relevant economic theories. Otherwise such policies run the risk of wasting scarce resources. The main theories relevant here are theories of innovation management as far as the part of enterprise

innovation is concerned, as well as the theory of market failure and of state failure as far as governmental policy is concerned. Theories of diffusion of innovations and competitive advantage are also relevant. The following is a summary of how specific theories can support analyses in this study and formulating policy recommendations – a necessarily shallow summary considering the rather small scope of this study.

Innovation management theory

Innovation management theory is developing systematic tools and knowledge on how to best manage innovation processes. It is multi-faceted, as different innovation management models can be used for different types of innovations. This applies for example, to product and service innovations, organisational innovations or with regard to the distinction between incremental, radical and disruptive innovations. Recent discussions focus on whether innovation processes should be structured (for incremental innovations) or more iterative and experimental (for radical or disruptive innovations). Contributions of Chesbrough (2003) on open innovation and von Hippel (2003) on user-centred innovation (especially through lead users) are insightful for SMEs' activities to internationalise innovation. The current trend to practice **open innovation**, i.e. to co-operate with actors outside the company in order to innovate, may lead to more and more SMEs exploring the set-up of partnerships beyond the borders of their home country and beyond Europe in order to source the most promising new knowledge. **User-centred innovation** may require adapting innovative products and services to the specific needs of customers in foreign countries. In this respect, innovation management theory can help to understand companies' innovation management approaches especially with regard to drivers and barriers in the innovation process.

Diffusion of innovations theory

Diffusion of innovation theory, closely linked with the book of the same name by Everett M. Rogers, (2010) seeks to explain the spread of new ideas, products or services. Introduced in the 1950s, this well-known theory is still widely used. Rogers proposed four main elements that influence the spread of a new idea: the innovation, communication channels, time, and a social system. Individuals progress through five stages: awareness, persuasion, decision, implementation, and adoption. The concept makes a distinction between different types of innovation decisions and describes the adoption process. Rogers' ideas can be linked with Mark Granovetter's concept of "embeddedness", meaning that economic activities of individuals or companies are "embedded" in social relations.[22] From the perspective of an innovative SME seeking to internationalise its business, such considerations may be important for adapting marketing strategies, products and services to the specific requirements in foreign countries. For example, in countries which are generally more adaptive to innovative technologies, market access may need to be planned differently than in countries with lower adaptiveness.

Theory of competitive advantage

Competitive advantage is a conceptual framework developed by Michael E. Porter (1990, 1985). It can be applied to both countries (nations) and enterprises and hence be used for governments' and enterprises' strategic planning and decision making. The theory suggests that countries should pursue policies and enterprises should pursue strategies suiting their specific competitive conditions. One of Porter's key concepts is the "national diamond". It recognises four pillars shaping the competitive situation: factor conditions, demand conditions, related and supporting industries, firm structure, strategy and rivalry. A country – or the EU as a federation of countries – competing in a particular international market can be advised to analyse and consider these pillars

[22] See Granovetter (1985).

for forming its SME support policies. The pillars can also be helpful for enterprises to decide which country is particularly well suited to expanding into.

Market failure theory

A market failure is a situation in which free markets produce inefficient results.[23] Market failures imply that rational decisions of individuals based on self-interest lead to situations that are unfavourable from a societal point of view. The compilations and interpretations of market failures differ. Possible market failures in the field of internationalising SMEs' innovation activities can be traced back to three factors: externalities, imperfect competition and imperfect information. They may justify public support of innovative SMEs, including internationalising innovation.

An **externality** is an impact on a party that is not directly involved in a transaction. Externalities imply that prices do not reflect the full costs (negative externalities) or benefits (positive externalities). Innovative SMEs can be considered to have positive externalities to society beyond the individual benefits of the entrepreneur. For example, they introduce new products, services, processes or methods that enhance consumer welfare. **Imperfect competition** means that one or a few agents in the market are able to shape the equilibrium allocation by their own investment, pricing or quantity decisions. In reality there are few, if any, examples of perfect competition, so that there are many arguments in favour of state regulation or intervention to counteract market power. Hence one could argue in favour of support for SMEs because they may, due to their limited resources, rather be disadvantaged by the competitive situation in their markets. **Imperfect information** may lead to inefficient investment decisions. For example, innovative SMEs may have imperfect information about market conditions in foreign countries and about resources available for accessing foreign markets. This can lead to SMEs' suboptimal investments into accessing foreign markets. Big firms in principle face the same issue but may have more resources to gain the desired information.

Government failure theory

Government failure theory is the counterpart of market failure theory. It deals with possible failures in governmental decisions, i.e. with inefficient policies wasting public resources.[24] Assuming that governments as well as companies and industry lobby groups act rationally in an economic sense, political decision making is a "game" between these sets of players. It can be assumed that companies and lobby groups seek to maximise their individual utility and the profits of their members, respectively. This may for example mean that innovative SMEs and their lobby associations may try to gain public funding for internationalisation activities which they would engage in even without public support. Governments may have different objectives, aiming at the best solutions for society at large. However, some schools of economic theory assume that governments also act in their own interests. For example, governments may seek to increase the probability for being re-elected or to adopt policy measures which are in line with their own ideology or which support specific lobby groups. Big industry may then be better positioned to influence governments than SMEs. Policies in support of internationalising SMEs' innovation activities could also be used to pursue such motives. In any case, government failure can be traced back to one principal source, imperfect information, because governments and their agencies do not know, for example, SMEs' real motives and resource endowment.

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[23] The following elaborations about market failure theory have been adapted from European Commission (2009): ICT-related industrial policy, section 3.2.3.

[24] The following elaborations about state failure theory have been adapted from European Commission (2009): ICT-related industrial policy, section 3.2.4.

3 CASE STUDIES

3.1 An overview of research methods and the twelve cases examined

Objectives of case study research

This chapter presents twelve case studies of SMEs' activities to internationalise innovation and produces an inductive analysis of their practices. The main purpose of the case studies was to clarify three issues about internationalisation of innovation activities:

- types of practices,
- drivers (motivation) and barriers (challenges),
- advantages and disadvantages of the experience, including impacts and possible failures.

Based on these three issues, the case studies address the following key questions:

- **Why** did the SME engage in international innovation activities?
- **How** did the SME internationalise its innovation activities? How did the SME establish and develop the international links with target countries or partners?
- **When** did the SME start engaging in international innovation activities? What were the milestones since starting the engagement?
- **What** was the SME's rationale for selecting the target countries or partners for its international innovation activities? What were the drivers for the activities and what barriers did the SME encounter?
- **Who** helped find the right contacts?
- Did the SME use **public support measures**? If yes, which? How important were these measures for establishing or developing the international innovation activities? How does the SME assess the support measures? Would it use the measures again? Would it recommend other countries or regions to introduce the same measures?
- What **impact** did the international innovation activity have? For example on the SME's competitive position (market shares), customer relationships, the quality of its products or services, its reputation, number of employees, turnover?
- Have there been **failures** in international activities, and why did they occur?
- What **lessons** can other SMEs and policy makers learn from the SME's experience?

Criteria for selecting case studies in this study

The twelve cases were selected in a deliberate manner according to the following criteria. The compilation of cases does not claim to represent a "best of" selection. There are other numerous other cases that would also meet the criteria set and which could be examined in future studies.

The initial criterion for selecting cases was the **size** of the company. The study team applied the European Commission's official definition and defined SMEs as companies with fewer than 250 employees and which have an annual turnover not exceeding 50 million euro or an annual balance sheet total not exceeding 43 million euro or both. On the lower end, this also includes micro enterprises with fewer than ten employees. On the upper end, some companies that grew beyond the threshold of 249 employees due to internationalising their innovation activities were also included in the selection of SMEs for this study.

Furthermore, the study specifications required focusing on "European SMEs that have chosen to 'internationalise' their innovation activities over the last decade – in particular with third country partners or to accomplish market introduction / success in a third country economy", whereby "third country" means "outside the EU" (European Commission, DG RTD 2015, p. 8). This means

that the SMEs selected for case study research fulfil specific characteristics related to place, time, type and industry:

- **Place**: The selected SMEs have their headquarters in Europe, comprising the EU Member States as well as countries associated with Horizon 2020.[25] The selected SMEs are from ten different countries.
- **Time**: Most of the selected SMEs have internationalised their innovation activities between 2000 and 2010. This may include SMEs that were established before this period or within. The SMEs thus have experience in internationalising innovation activities of at least five years. SMEs founded after 2010 are thus not covered (with one exception).
- **Type**: The selected SMEs represent different types of internationalising innovation activities in order to produce a broad range of experiences and insights – see section 2.1 above in this report for the types of internationalisation distinguished here.
- **Industry**: The SMEs represent a broad variety of different industries. Six of them sell technologically-based products or devices (Aisense, Fruit Freshly, Intermet, Kapro, NUMECA, poLight), the other six technology-based services (Acreo, KeyGene, LifeTec, Real Project Partner, Ticketbis, WEPROG).

Overall approach to case study research

The case studies cover four to five pages and follow a homogeneous format which facilitated cross-case analyses:

Key findings in a nutshell, abstract, fact sheet
Background: business profile, marketing approach, reasons for internationalising innovation
Practices and experiences in internationalising innovation
Impacts and lessons learned
Sources used and appendices

3.2 Case studies about internationalising innovation in SMEs

The following twelve cases were selected for case study research. Exhibit 3-1 provides an overview of the selected SMEs, their characteristics and the status of research for the case. The cases are presented by alphabetic order of the firm's name.

[25] Horizon 2020 affiliate countries include EU-28 plus the three EFTA countries of Switzerland, Norway, and Iceland (but not Liechtenstein); the five Balkan countries of Bosnia-Herzegovina, Serbia, Montenegro, the Former Yugoslav Republic of Macedonia, and Albania; Moldova, Turkey and Israel as well as the Faroe Islands. See http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h2020-hi-list-ac_en.pdf.

Exhibit 3-1: Case SMEs in the study about internationalisation of innovation in SMEs

No.	Name, headquarter country, URL	Emp-loyees	Foun-ded in	Industry, business activity	Type of internationalising innovation
1	Acreo Swedish ICT AB, Sweden (https://www.acreo.se)	135	1999	ICT solutions for sustainable growth and competitiveness in industry and society	Collaborative research project with China (Lizhong Group), University of New Delhi
2	Aisense d.o.o., Slovenia (http://www.aisense.si)	< 10	2014	Health technology; developing and selling a handheld gamma radiation hotspot locator	Collaboration with non-European partners in product development, including technologies that have yet to enter commercial markets
3	Intermet, Poland (http://www.protectorsystem.eu)	50	1990	Manufacturing and sales of coils and winding drums, as well as a wide range of products from razor tape	Collaboration with partners outside Europe; customising products and services for foreign markets
4	Kapro, Israel (http://kapro.com)	300	1989	High-end construction and carpentry tools	Branches: Two wholly owned subsidiaries in the US and China
5	KeyGene, Netherlands (http://www.keygene.com)	135	1989	Biotechnology; natural genetic variation in vegetable and other 6F crops	KeyGene has a joint laboratory in Shanghai, China, and a subsidiary in the US.
6	LifeTec, Netherlands (http://lifetecgroup.com)	12	2004	Medical technology services; compliance and efficacy studies of healthcare products, interventions and therapies	Customisation: Development and supply of R&D solutions for clients also outside Europe
7	Numeca, Belgium (http://www.numeca.com/en)	130	1993	Developing and producing software tools for computational fluid dynamics and analysis	Collaboration, IP acquisition, hiring employees from foreign countries. Highest number of projects with co-participant from China or India
8	poLight, Norway (http://www.polight.com)	10-50	2006	High performance micro optics autofocus components	In the EU, collaboration with two national PROs (Sintef, MicroTech) and a Swiss university (EPF Lausanne), in the US with an MNE (Texas Instruments)
9	Real Project Partners, France (http://rpp.fr)	6	2003	Developing and deploying products with fibre and power line technology, particularly combining TV and smart metering	Collaboration: Product development with partners in South Korea and Japan
10	Food Freshly GmbH (http://www.foodfreshly.net)	7	1994	Development/marketing of a process keeping cut fruit and vegetables fresh	Branches in US and Dubai, international partners, customisation, company founder with immigration background
11	Ticketbis, Spain (http://www.ticketbis.com)	350	2009	Online secondary market platform for buying and selling event tickets customer-to-customer	Branches and low-level customisation: Adapted websites and operations for countries outside Europe
12	WEPROG, Denmark/Germany (http://weprog.com)	< 50	2003	Ensemble weather forecasting mainly for the energy industry	Customisation: Developing specific services for customers all over the world

Source: empirica / dialogic

3.2.1 Acreo, Sweden: Collaborating with numerous partners around the world in R&D projects and selling to international customers

IN A NUT SHELL	**Acreo is a non-profit research institute in hardware-oriented ICT. The institute collaborates with a wide network of international R&D partners, sells its services to international clients, and employs researchers from more than 25 countries. Participating in trade fairs helped widen contacts with industry.**

Abstract

Acreo Swedish ICT is a non-profit research institute in micro and nano electronics as well as photonics. The Swedish government is the majority owner but industry associations also have a share. Acreo is based near Stockholm and has 135 employees. Acreo's main competitors are other large research institutes and universities. In order to remain at the top end of technological advance, Acreo in each project needs to find the best universities and companies to co-operate with. Hence the institute collaborates with a wide network of international partners for research, development and innovation purposes, and it provides its services to international clients. Acreo also has a strong international staff base: The institute's employees come from more than 25 different countries. While one may expect that a top research institute like Acreo may find it easy to establish links with foreign countries, common difficulties of distance and foreign culture also apply. For example, it took Acreo three years to conclude a contract with a Japanese enterprise. Acreo uses a governmental agency, Business Sweden, for developing some of its international contacts. This relationship is mutual because Acreo also helps Business Sweden develop its network and competencies in issues related to Acreo's specific expertise.

Case study fact sheet

▪ *Full name of company, headquarters location, country, and URL:*	*Acreo Swedish ICT AB, Kista, Sweden (http://www.acreo.se)*
▪ *Departments:*	*Gothenburg, Hudiksvall, Norrköping*
▪ *Year of foundation:*	*1999 (merger of institutes founded in 1950s and 60s)*
▪ *Number of employees (year):*	*135 (2015)*
▪ *Budget in most recent financial year:*	*189 million Swedish Crowns (SEK) (20.4 million Euro) turnover in 2014 (2013: 179 million SEK / 19.4 million Euro)*
▪ *Sector:*	*Research and development*
▪ *Business activity:*	*R&D as well as small-scale production and prototyping in micro and nano electronics as well as photonics*
▪ *Activities focused in this case study:*	*Collaboration with R&D partners outside Europe*
▪ *Case gatekeeper:*	*Leif Ljungqvist, CEO, Acreo*

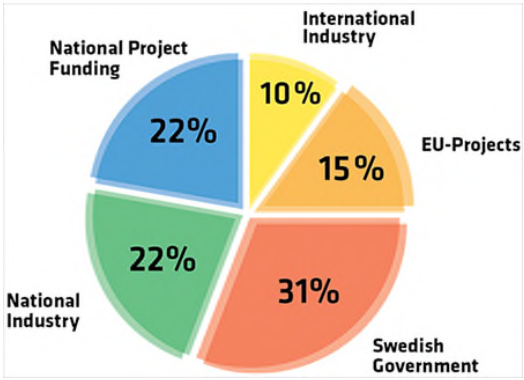
Background

Business activity and competitive situation

Profile: Acreo Swedish ICT is an independent non-profit research institute in hardware-oriented information and communication technology (ICT). The majority owner is the Swedish government; two industry associations are minority owners.[26] The institute's headquarters are based in the town of Kista near the Swedish capital Stockholm and a further three departments are located in the Swedish cities of Gothenburg, Hudiksvall, and Norrköping. Acreo has 135 employees and considers itself to be one of Europe's top research institutes within some of its technology platforms in the areas of micro and nano electronics as well as photonics. The institute has facilities and resources for advanced research and development (R&D) as well as small-scale production and prototyping. Its mission is "to find new ICT-solutions for existing and future demands, creating sustainable growth in industry and society".[27]

In 1999, Acreo was formed through the merger of two research institutes founded in the 1950s and 60s. The initial business **objectives** are still valid today: Developing and refining R&D results and transferring them to industry, thereby co-operating with enterprises and universities. While Acreo does not target growth of the whole institute, it needs to consider continuously which new research areas should grow. In order to fulfil its objectives and remain at the top end of technological advance, Acreo in each project needs to find the best universities and companies to co-operate with.

Exhibit 1-3-2: Acreo's funding in 2014



Source: https://www.acreo.se/about-us/finance

The relatively largest share of Acreo's **budget**, 31% in 2014, comes from the Swedish Government. Further 22% each come from national industry and national projects. A quarter comes from international sources: 10% from international industry and 15% from European research projects. See Exhibit 1-1.

The institute's **clients** are from the public sector in Sweden and from private business nationally and internationally. Hence, while Acreo is not privately owned, due to its strong orientation towards industry, it has some sense of commercial pressure. Beyond R&D projects, Acreo offers its clients expertise in ICT and innovation, pre-studies, advanced test and demonstration milieus, small scale production, a comprehensive network, and seminars and workshops. Acreo's **competitors** are other large research institutes, universities and to some extent consultancies with similar expertise, nationally and internationally. However, they may also be co-operation partners, depending on the constellation of challenges and business opportunities.

The business model is built around permanent top-end **innovation**. Acreo's four key areas of expertise are sensors and actuators, power electronics, digital communication, and life science.[28]

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[26] Acreo Swedish ICT AB is owned by Swedish ICT Research AB. Majority owner of Swedish ICT Research AB is RISE AB (60%), a company owned by the Swedish Ministry for Industry. The other 40% are owned by two industry associations: FMOF (Föreningen för Mikroelektronisk och Optisk Forskning, "Association for New Microelectronic and Optical Research"), with 22 members particularly from large and international players, and FAV. See https://www.acreo.se/about-us/owners. Acreo Swedish ICT is part of the Swedish ICT Group which also includes Interactive Institute Swedish ICT, SICS Swedish ICT, and Viktoria Swedish ICT.

[27] Quote from https://www.acreo.se/about-us.

[28] See https://www.acreo.se/key-areas.

Exemplary projects include development of fabric-based sensors that can measure respiration, heart rate and movements in smart clothes; developing a "true" smart home where everything works together seamlessly and cost efficiently; and a solution based on fibre optics to measure temperature and atomic composition in real time in different stages of manufacturing and recycling processes for the steel industry.[29]

How and why Acreo internationalised its business activities

Acreo has internationalised its activities in several ways. Most notably over the years the institute collaborated with thousands of partners from all over the world in several hundred R&D projects. Acreo also provides services to many international enterprises. Furthermore, Acreo's employees stem from between 25 and 30 countries. For an institute with Acreo's profile and objectives, such internationalisation is a natural part of the business model, as Acreo's CEO Leif Ljungqvist says.

Internationalisation of innovation in Acreo

Practice

Acreo collaborates with **partners from numerous countries** all over the world – the institute has not counted them. The main countries to co-operate with depend on the technology concerned. Inside Europe, Acreo has co-operated with partners from almost all countries. Outside Europe, Japan, Brazil and the US are particularly prominent collaboration countries. Collaboration takes place on a project-by-project basis – beyond research projects there are no long-term agreements. However, there is an established co-operation with Brazilian universities and institutes also due to a number of employees coming from that country.

Acreo does not have dedicated agents for marketing its services in other countries, as a commercial enterprise of the same size may have. However, Acreo is planning to professionalise its marketing and sales activities with new functions. The institute also does not customise its services in a way a commercial enterprise would do. Acreo develops prototypes and "the real customisation takes place after the work we are doing", says Leif Ljungqvist. Furthermore, Acreo has not yet licensed technology from other countries but licensing agreements have taken place the other way round.

Drivers and barriers

Acreo's international activities developed naturally and as Leif Ljungqvist says, "by chance", without a certain strategy or plan. It was just a necessary thing to do in order to stay at the top end of technological developments. There were no specific milestones in internationalisation. Historically, Acreo attended and presented at many international conferences, as it is common for research institutes, and developed its network through contacts gained there. It also participated in international trade shows in order to present applied research, which resulted in a considerably increasing number of contacts to enterprises. Acreo began attending such shows some ten to 15 years ago. In 2015, Acreo went to approximately five trade shows in Europe and the US.

The two major challenges Acreo encounters in its international activities are **distance and culture**. "Distance is always a problem", says Leif Ljungqvist, because one needs to meet people personally and understand their thinking, approaches and behaviour. Cultural differences may lead to much longer communication processes than in Europe. For example, it took Acreo three years to conclude a contract with a Japanese enterprise, based on the way business is done in Japan. It may have taken only three months to conclude the contract with an enterprise from Europe, says Acreo's CEO. Initially there may have been a lack of understanding on the part of Acreo about how to approach this enterprise in the best manner.

[29] For descriptions see sub-sites on https://www.acreo.se/about-us-0/customer-stories.

Support to internationalisation

Acreo is occasionally working with an agency named **Business Sweden** that supports internationalisation of Swedish enterprises.[30] Business Sweden has offices around the world. In the case of the abovementioned Japanese enterprise, it was important that Business Sweden supported the liaison. In Japan, Business Sweden is located at the Swedish embassy in Tokyo that endows the agency with the necessary credibility. Leif Ljungqvist states that Acreo and Business Sweden have a mutual relationship. Business Sweden also learns and benefits from Acreo. Business Sweden has a more or less general knowledge about how business is contracted in a certain country, and the agency has a network of experts in the country. However, when it comes to specific inquiries from local businesses, Business Sweden may need specific contacts and knowledge that it does not have. Acreo may then help if its specific network is concerned.

Impact and lessons learned of internationalising innovation on Acreo

Impact

Internationalising innovation activities in terms of developing a global network of R&D partners and clients as well as hiring employees from many different countries was a necessity for Acreo. Such activities are required to remain at the top end of technological developments and to push forward into emerging fields.

There is however also a downside of such international engagements from the perspective of Swedish business: It might strengthen competitive advantage of enterprises outside Sweden. One could consider this as the other side of the coin of internationalisation – benefiting from expertise from other countries vice versa also increases expertise in the foreign countries.

As regards failures in internationalisation, CEO Leif Ljungqvist says that anyway only approximately 10% of contacts lead to assignments. In the vast amount of attempts, other organisations may be cheaper, better or better suited.

Lessons learned

- **Developing an international network and international staff**

Acreo does not only develop a broad and deep international network of R&D partners but also a strong international staff base: the institute's staff comes from more than 25 different countries.

- **Distance and foreign culture are difficult also for a top research institute**

While one may expect that a top research institute like Acreo may find it easy to establish links with foreign countries, common difficulties of distance and foreign culture also apply.

- **Using governmental agencies for dealing with difficulties of foreign cultures**

Acreo uses a governmental agency, Business Sweden, for developing some of its international contacts. This relationship is mutual because Acreo also helps Business Sweden develop its network and competencies in issues related to Acreo's specific expertise.

[30] See http://www.business-sweden.se/en.

References

Research for this case study was conducted by Stefan Lilischkis, Senior Consultant at empirica GmbH, Bonn, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following:

Interviews

- Leif Ljungqvist, CEO, Acreo Swedish ICT, 10 December 2015, via voice over internet.

Websites

Acreo: https://www.acreo.se and sub-sites, last accessed 10/12/2015.

Business Sweden: http://www.business-sweden.se/en, last accessed 11/12/2015.

3.2.2 Aisense, Slovenia: Developing and marketing a radiation detection device with partners in the US and Japan

IN A NUT SHELL	**Aisense is a start-up from Slovenia that develops and markets an innovative radiation detection device. Partners in the US and Japan were found through personal relations and an international trade fair. The company found it easier to establish trustful and promising contacts abroad rather than within Europe.**

Abstract

Aisense was founded in Slovenia in 2014 and has currently three employees. The company markets an innovative device that is able, in contrast to other products, to detect the direction of incoming gamma radiation in real time. Since there are only a few potential customers in Slovenia, Aisense is aiming at growth through developing and marketing the device internationally. In fact, the company's managers gained much more concrete interest in the device outside Europe. The company found partners in the US for developing the device further as well as for marketing, and prospective marketing partners in Japan. Many of them are extraordinarily agile and supportive. So far Aisense's managers encountered no cultural differences when co-operating with the US, while special tact is generally welcome with partners in Japan. Aisense did not yet use public support measures, not even funding from public research projects or base funding. While both founders are currently linked with the Jožef Stefan Institute in Ljubljana, the current model of the device was developed independently by one of the partners before his first employment at the JSI. The only indirect support was from the institute's technology transfer office on intellectual property matters.

Case study fact sheet

▪ *Full name of company:*	*Aisense d.o.o., Slovenia (http://www.aisense.si)*
▪ *Year of foundation:*	*2014*
▪ *Number of employees (year):*	*3 (2015)*
▪ *Budget in most recent financial year:*	*n.a.*
▪ *Industry sector:*	*Measuring technology*
▪ *Business activity:*	*Developing and selling a handheld gamma radiation hotspot locator*
▪ *Activities focused in this case study:*	*Collaboration with partners in the US and Japan in commercial and pre-commercial product development*
▪ *Case gatekeeper:*	*Matjaz Vencelj, Co-founder and Director, Aisense*

Background

Business activity and competitive situation

Profile: Aisense is a very young enterprise founded in 2014 and based in Eastern Slovenia. It develops and sells a handheld device for detecting radiation. The company's main product is called "aisense gamma" which Aisense claims to be "the world's first handheld gamma radiation hotspot locator with angular sensitivity".[31] The device's purpose is observing the dose rate and, most importantly, the direction of incoming gamma rays in real time. According to Aisense, other devices in contrast either only detect dose rates without the direction, or, in the case of true imaging cameras, they require exposition times rarely below a minute. The device can be used, for example, to localise hotspots and contaminated surfaces on nuclear installations and to search fissionable nuclear material as well as in nuclear medicine environments, in dirty bomb threats, and in orphaned radiation sources.

Aisense markets the product with the advantage of localising contaminated sources and other sources of gamma radiation much quicker than established methods, thereby saving costs and protecting employees. Another specific characteristic is a "clean, minimal and intuitive user interface" that is intended to eliminate the need for personnel training or even a manual. Aisense is also affiliated with a dose rate mapping application called "Route Monitoring for Android™"[32] that can also be used for competitors' devices. An interactive map shows the measured points in real time.

Exhibit 2-3-3: The "aisense gamma" device

Source: http://www.aisense.si/

Aisense's business **objective** is "maximum market penetration", as co-founder Matjaz Vencelj says. As soon as more orders come in, the company would need to hire assembly workers and establish full-time management. The company does not intend to attract growth investment. "We are happy having no reporting duties", says Matjaz Vencelj.

The two founders of Aisense are currently employed at the **Jožef Stefan Institute** (JSI) in Slovenia's capital Ljubljana. Aisense already co-operates closely with JSI by purchasing the calibrations at the JSI's Dosimetry Standards Laboratory and by planning to start activities on collaborative development for a new product. The technology of the current product, however, was developed by one of the founders in his spare time before his employment and without using JSI facilities. Hence Aisense is not a typical spin-off in a narrow sense because the technology was not developed in the framework of a research project or on baseline funding. The company also employs a market strategist.

[31] See http://www.aisense.si.

[32] See http://www.aisense.si/dose-rate-mapping.

Among Aisense's **clients** are JSI's Radiation Protection Unit (RPU), the Mobile Radiological Laboratory (MRL) of Slovenia, the Institute of Occupational Safety (IOS) in Slovenia, the Krsko Nuclear Power Plant in Slovenia, the US Y-12 National Security Complex, and the Federal Office for Civil Protection of Switzerland. In general, the company targets clients in the fields of first responders, civil defence, power installations, military, police, fire brigade, customs and border control, nuclear and environmental services, and nuclear medicine. Aisense's main **competitors** are enterprises marketing established methods to detect gamma radiation. There may be five to ten such suppliers. However, according to Aisense there are no competitors yet for a device with the same properties.

Innovation is crucially important for Aisense. A patent is pending for the configuration of several detectors, combined with a proprietary framework for adaptive signal analysis. Aisense is closely collaborating with the nuclear industry, first responders and researchers "to continuously evolve the specifications and keep improving the user experience".[33] For 2016, a vastly updated version of the device is planned that also allows neutron detection. Aisense plans to collaborate with detection device manufacturers in order to have close contact to their R&D cycle.

How and why Aisense internationalised its business activities

Since North America is one of Aisense's largest markets, the company is drafting a formal co-operation with a small US enterprise operating in the homeland security market, to potentially cover the markets of US and Canada. "Customers will feel safer when served by a company based in the US", says co-founder Matjaz Vencelj. Furthermore, Aisense is in contact with a large Japanese company that has experience in marketing that type of technology. Japan is a large market for the device as well. Aisense is also targeting Western Europe but without a co-operation partner at the moment. Finally, Aisense collaborates with several international governmental research institutes.

Internationalisation of innovation in Aisense

Practice

Aisense used a major international conference to present its device, the IEEE Nuclear Science Symposium & Medical Imaging Conference[34] in San Diego, US, in early November 2015. This conference was also important for the company's founders in terms of research. This is where the contacts to Japan were established – representatives from two Japanese companies came to Aisense's booth and suggested co-operation. Aisense welcomed this offer because experience by other European enterprises teaches that in order to be able to sell in Japan they inevitably need to have a Japanese representative. The contacts to the small US partner were established through a friend of a friend of one of the founders.

Drivers and barriers

Aisense found that collaboration with companies from the US and Japan is more effective than with Europeans – the US and Japanese contacts act faster, appear to be more interested, and it is easier to reach the decision makers. Furthermore, in Aisense's experience "one contact in the US brings many more ensuing contacts", as Matjaz Vencelj says. "I enjoy working in the US environment", says Matjaz Vencelj. "They start interaction by trusting that you are going the right way, while Europeans start with doubts."

Aisense finds that the US company is an "almost perfect partner". In Matjaz Vencelj's experience, the culture is "nearly identical", communication is "just as with someone you studied with". It is

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[33] See http://www.aisense.si.

[34] See http://www.nss-mic.org/2015.

somewhat different with Japan; particular tact is required. Oftentimes, interlocutors from Japan do not tend to show it directly when they have not understood something completely. One has to find out later and then be careful not to insult the interlocutor.

In its co-operation with Japan, Aisense also encountered language problems. In an anecdotal example, based on the English version, the Japanese partner produced a brochure about the device in Japanese. For a micro company it would be resource-consuming to have the Japanese version proof-read in-depth. Aisense needed to find a friend who speaks Japanese to verify the translation. A difficulty with both partners is time difference, requiring to work at unusual times when direct communication is necessary.

Support to internationalisation

Aisense has so far not received any public support, and the company is reserved against it. As regards national programmes, "often public support is designed in a rigid way", says Matjaz Vencelj. "They force you to use the funds and grow the company in a specific way." While he understands this kind of strictness in public programmes, this would not be appropriate for the market in which Aisense operates. As regards European programmes, Aisense found that they are overly bureaucratic.

Impact and lessons learned of internationalising innovation on Aisense

Impact

So far, co-operation with international partners was very helpful for Aisense to prospectively gain access to large markets. The company until now did not experience any failures.

Lessons learned

- **Business development outside Europe may be easier than inside**

Aisense found it easy and pleasant to establish promising and trustful contacts to the US and Japan. In fact it was far more difficult to engage with partners in Europe.

- **Try to finance international business development yourself**

In Aisense's opinion, one should develop business oneself to the largest possible extent, without third-party funding, also insofar international activities are concerned. This will allow focusing on developing the business, not having to engage in time-consuming reporting duties.

- **The right idea and some luck will help finding international partners**

For Aisense it was no big deal to find the international partners – it was a matter of accidentally meeting the right people at the right time. Maybe it was also fortune favouring the brave.

The latter two lessons may reflect the situation of a very young company with a rather specific target market and founders who are still employed at a public research institute.

References

Research for this case study was conducted by Stefan Lilischkis, Senior Consultant at empirica Gesellschaft für Kommunikations- und Technologieforschung mbH for the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus:

Interviews

- Matjaz Vencelj, Co-founder and Director, Aisense, voice over internet, 14 December 2015.

Websites

Aisense, http://www.aisense.si, last accessed 14 December 2015.

IEEE Nuclear Science Symposium & Medical Imaging Conference, http://www.nss-mic.org/2015, last accessed 14 December 2015.

3.2.3 Fruit Freshly, Germany: Selling freshness retainers and related services internationally

IN A NUT SHELL	**Food Freshly sells freshness retainers for cut fruits and vegetables as well as related services to more than 20 countries. International business develops through trade fairs and inquiries from potential buyers all over the world. The firm seeks help from the Chambers of Commerce or Foreign Trade if need be.**

Abstract

Food Freshly sells freshness retainers for cut fruits and vegetables and provides related services. The company was founded in 1994, is based in Bielefeld in North-Western Germany and has seven employees. Its core business is in Europe and North America but the company also sells to South America, South Africa and Asia – altogether to more than 20 countries. The company constantly improves existing products, develops new formulations for applications, and it enhances efficiency of existing processes. Originally the company only sold to German customers but international business developed when inquiries from foreign potential buyers came in with the rise of the internet. Food Freshly also extends its international business through presenting at international trade fairs. The company does not experience serious barriers to international business but it needs to deal with cultural differences, language barriers and also customs issues that may prolong delivery time. Food Freshly established a subsidiary in Canada in order to be able to better serve the important North American market. It also has a branch in Dubai for developing the Arabian market. So far the company has not yet used public support measures or participated in publicly funded research projects. If need be, Food Freshly seeks advice and legal services from the Chamber of Commerce and the Chamber of Foreign Trade. International business had a positive impact on the company – it grew with its foreign customers.

Case study fact sheet

▪ *Full name of company:*	*FOOD Freshly AFC – Agriculture & Food Consulting GmbH, Bielefeld, Germany (http://foodfreshly.net)*
▪ *Subsidiaries:*	*FOOD Freshly North America Inc., Mississauga, Canada* *FOOD Freshly Middle East, Dubai, United Arab Emirates*
▪ *Year of foundation:*	*1994*
▪ *Number of employees (year):*	*7*
▪ *Industry sector:*	*Food and beverages*
▪ *Business activity:*	*Selling freshness retainers for cut fruit and vegetables as well as related services*
▪ *Activities focused in this case study:*	*Offering products and services from branches in the US and Dubai*
▪ *Case gatekeeper:*	*Benjamin Singh, Marketing Manager, Food Freshly*

Background

Business activity and competitive situation

Profile: Food Freshly sells freshness retainers and sanitizers for freshly cut fruits and vegetables. It is a family-owned company based in Bielefeld in North-Western Germany. The company has two subsidiaries, one in Mississauga near Toronto in Canada, and one in Dubai, United Arabic Emirates. It was founded in 1994 by Sukhdev Singh, a native Indian. He sought realising business opportunities that opened up through contacts to experts in the field of preservatives. Today the company has seven employees.

Food Freshly's **products** are powdery dry-blends of vitamins and minerals which, according to the company, extend the shelf-life of cut fruits and vegetables to over 21 days. The products are patented and have registered trademarks. Food Freshly claims that their product range is approved to be used worldwide, and it can be applied to almost any fruit or vegetable. The company advertises the application to be easy, comprising four steps: Dilution of freshness retainers, dipping freshly cut fruits and vegetables in the solution, drying them, and packing them. All products are manufactured in Germany. Exhibit 1-1 shows the process for applying the company's products.

Food Freshly also offers **project management services** because the retainers need to be used "in conjunction with an efficient and well setup process"[35]. Customer development may take quite a while and require in-depth consulting, as also indicated in the company's legal name. Such services are related to enhancing efficiency, developing new products and improving quality.

Exhibit 1-3-4: Process for applying Fruit Freshly's products and services

Source: Fruit Freshly brochure

The company's **customers** are companies producing fresh cut fruit and vegetables – no canned food, and no other types of food. Hence, the company serves "a niche in a niche", as marketing manager Benjamin Singh says. The company sells to more than 20 countries. While the core business is in Europe and North America, it also has customers in South America (Mexico, Peru, Chile), South Africa, Arabia (United Arabic Emirates, Saudi Arabia, Kuwait) and Iran, South Korea, and India. The company has sent product samples to countries all over the world. Its business **objective** is to grow further in the core markets where freshly cut fruit and vegetables have a large customer base such as the United Kingdom and Spain in Europe as well as North America. The large customers are located there. Food Freshly's **competitors** are mainly larger companies in the trade and chemicals business. In contrast to many competitors, Food Freshly's products are completely free of sulphites, allergens and genetically manipulated organisms.

Innovation is very important for Food Freshly. The company constantly improves existing products, develops new formulations for applications that are not covered by its standard product range, and it enhances efficiency of existing processes.

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[35] See http://foodfreshly.net/project.php.

How and why Food Freshly internationalised its business activities

Originally, Food Freshly did not aim at selling beyond Germany. However, Germany is not the most favourable country to sell freshly cut fruit and vegetables: First, there is no deeply rooted tradition for such type of food. Second, if people buy it, they tend to go for low-priced food treated with preservatives rather than natural but more expensive procedures such as those offered by Fruit Freshly. Hence, when inquiries came in from other countries, Fruit Freshly welcomed the opportunity to extend its geographical market. This occurred with the rise of the internet around the turn of the millennium. Today, three quarters of sales are outside the home country.

Internationalisation of innovation in Fruit Freshly

Practice

Food Freshly's two **subsidiaries** pursue different functions. The subsidiary in Canada, which was founded in 2013, is meant to serve North America as the company's largest market. The subsidiary in Dubai, founded in 2014, is rather meant to develop the Arabian market. Both branches are managed by native speakers in order to be as close to the customers as possible. Food Freshly also has sales **partners** in order to market its products and services more effectively. These are often companies that can store Food Freshly's products, ensuring swift delivery.

Customisation of products occurs increasingly often. An estimated share of 20% of the company's sales is customised. Sometimes a special fruit or vegetable provides a challenge in terms of overall shelf-life, micro bacteria, or process set-up. In case an advanced solution is necessary, Food Freshly conducts internal trials.[36] Another example is that Food Freshly can, together with the retention procedure, flavour fruits – giving apples a grape flavour was a recent project.

As regards **staff**, Food Freshly has an international base right through the fact that it was founded and is led by an immigrant from India. Furthermore, one of the company's marketing specialists is from Spain, which qualifies him perfectly for dealing with Spain and South American countries.

Barriers to internationalisation

In its business activities outside Europe, Food Freshly encounters challenges related to cultural differences, language barriers, and customs. In Benjamin Singh's experience, **cultural differences** are no major barriers, but different cultures require different approaches. For example, US customers tend to require very efficient and to-the-point communication, while South-East Asian customers require a more "decorative" way of communication. It is a matter of courteousness to adapt to the customer. Moreover, US customers demand more service than those in Europe. Cultural differences do however not only occur outside Europe. "As a German you can even have cultural problems with someone from Switzerland", says Benjamin Singh.

Language barriers rather occur in Europe. For example, in the important Spanish market, English is not sufficient because at some point in the consultations a level of detail is required that needs to be dealt with in the mother tongue. **Customs** issues may extend the delivery process. This may be a problem because customers often wish to receive the product within a week, if not in a store around the corner.

Support to internationalisation

Food Freshly did **not yet receive any public support** for its international business activities. So far it has not considered participating in foreign trade delegations or publicly supported international research and development projects. When expertise is required for entering or serving foreign markets, for example in legal issues, the company finds paid help at the Chamber of Commerce and the Chamber of Foreign Trade.

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[36] See http://foodfreshly.net/r&d.php.

The company gained many international contacts through presenting at **international trade fairs**. Fruit Freshly participates in eight to ten trade fairs per year all over the world. Luckily, the most important trade fair, the Fruit Logistica, takes place in Berlin. This is posing no language barriers and it is a city that can relatively quickly be reached from Fruit Freshly's headquarters.

Impact and lessons learned of internationalising innovation on Food Freshly

Impact

Marketing Manager Benjamin Singh says that internationalising the company's business activities has definitely had a **positive impact**. The company grew and intends to grow further with its foreign customers. Furthermore, the company learned much from high quality demands in the North American market, in particular in terms of food safety.

According to Benjamin Singh, it is a natural thing that a company does not gain all customers it seeks to do business with. His advice to other SMEs is to **prepare well.** Fast business normally does not work. When entering a new market, one needs to fathom the size of the market and the customers' preferences. Then one needs to consider how to serve the market best. Is it necessary to have a branch, or can the market be served through trade agents or even through the internet?

Lessons learned

- **International growth through presenting at trade fairs and through internet inquiries**

Food Freshly develops its international activities through presenting at international trade fairs and through inquiries by chance which occur since the rise of the internet. Hence, the company does not apply particularly complicated methods for gaining new customers.

- **Cultural differences require different communication styles**

Food Freshly has customers in many different countries and experiences different communication preferences. It is advisable to adjust to the customer's style and, for example, treat a US American customer in a direct and efficient manner as he or she desires.

- **Internationalisation may go well without public support**

Food Freshly did not receive any help from governmental agencies, support programmes, or publicly co-funded research projects. Help from the Chamber of Commerce and the Chamber of Foreign Trade has so far been sufficient for entering and expanding foreign markets.

References

Research for this case study was conducted by Stefan Lilischkis, Senior Consultant at empirica GmbH, Bonn, Germany, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following.

Interviews

- Benjamin Singh, Marketing Manager, Fruit Freshly AFC GmbH, phone interview, 29/3/2016.

Websites

Food Freshly homepage: http://foodfreshly.net, last accessed 29/3/2016.

Food Freshly North America homepage: http://foodfreshly.com, last accessed 29/3/2016.

Literature

Food Freshly brochure, http://foodfreshly.com/files/food-freshly-english.pdf, last access 29/3/2016

3.2.4 Intermet, Poland: Sales of critical infrastructure protection systems and modular affordable housing solutions to customers outside Europe

IN A NUT SHELL	**Intermet sells composite and metal products such as protection systems to customers in the Middle East, Africa, and South-East Asia. Trade chambers and embassies help find the right contacts, in addition to trade exhibitions and trade missions. Cultural differences are the most important challenge.**

Abstract

Intermet is located in North-Western Poland and sells innovative composite and metal products such as protection systems of razor wire and mesh, intelligent protection cables, noise barriers as well as modular affordable housing systems for poor people and refugees. Intermet was founded in 1989 and has 49 employees. While the main customers are from Europe, the sales strategy is directed at Middle East and African countries and Indonesia. Main competitors are located in China. The most important element of Intermet's development strategy is a broad involvement in European research and development projects together with renowned Polish and European institutes. Intermet internationalises its activities in order to win world markets for its special products. Trade exhibitions are an important means for Intermet to develop its international business. Trade chambers and embassies as well as trade missions also help Intermet find the right business partners. Moreover, Intermet received money from the Cohesion Fund, the Regional Development Fund, the Polish Agency for Enterprise Development, and the National Centre for Research and Development. The biggest challenge in international business activities is cultural differences, which Intermet experiences particularly in the Middle East and Africa. Sometimes such differences lead to failures in business negotiations. However, all in all, international activities had strongly positive impacts on Intermet, namely on the number of employees as well as on product and process quality.

Case study fact sheet

▪ *Full name of company, headquarters location, country, and URL:*	*P.P.U. INTERMET Sp.z o.o., Człuchów, Poland, (http://www.intermet.pl)*
▪ *Year of foundation:*	*1989*
▪ *Number of employees:*	*49*
▪ *Industry sector:*	*Manufacture of fabricated metal and composite products*
▪ *Business activity:*	*Manufacturing and marketing of critical infrastructure protection systems and composite modular affordable housing systems*
▪ *Activities focused in this case study:*	*Practices in internationalising business and dealing with cultural differences as challenges of foreign trade*
▪ *Case gatekeeper:*	*Rafał Groński, Export Director, Intermet*

Background

Business activity and competitive situation

Profile: Intermet manufactures and markets composite and metal products such as protection systems – razor wire, razor mesh and mobile protection systems –, intelligent protection cables, modular affordable housing systems and noise barriers (see Exhibit 1-1). The products are mainly

used for protecting people and objects from terrorist attacks, and protecting ships from pirate attacks. Intermet is also involved in a project developing shelter modules with systems of rain and grey water purification for refugee camps and poor people in Africa. The company has 49 employees, mostly engineers, toolmakers and production specialists, and is located in Człuchów, a town in North-Western Poland. It was founded in 1989. Production takes place completely in Poland.

Intermet's main **customers** are European enterprises. However, the company also has customers in countries beyond Europe like Africa, the Middle East, and Indonesia. The final use of Intermet's products is often in countries influenced by armed conflicts, for example Syria, Egypt, Jordan, Lebanon, and Turkey, as well as countries facing severe problems with housing for the poor like Nigeria, Cameroon, Congo, and Rwanda. Hence, the most important market development for Intermet is the current social-political situation in the world. This situation induces an increased demand for solutions in the field of housing for refugees and poor people as well as for protecting people and infrastructure against attacks.

Exhibit 1-3-5: Prime examples of Intermet's product range

Source: http://www.intermet.pl/en, photos by Intermet

Facing international competition, Intermet considers service quality as vital. According to the company's self-description, this implies instant feedback, credible information, short lead times and a flexible attitude towards non-standard projects. Intermet's main **competitors** are located in China. As far as composite houses for refugees, camp protection systems, and fleet ship protection are concerned, Intermet says that they do not have competitors with a similar offer. Intermet estimates its market share to be approximately 10%. It seeks increasing this share to 25% after having implemented all current European projects, along with doubling the number of employees in the next two to three years.

Intermet considers **innovation** to be very important for its business: first because of international competition, and second because the availability of raw materials is limited and recycling a necessity. Hence, Intermet puts strong emphasis on improving manufacturing processes. The company holds patents for several processes, for example a US patent for a method to produce wire blades. Intermet carries out ambitious research and ensuing implementation, often in the framework of European projects. Over the years, Intermet participated in 30 projects funded by the European Union, approximately half of them R&D projects. The company regularly co-operates with research institutes specialising in particular technologies. Examples include the Technical

University of Gdansk in Poland, the Lightweight Construction Centre Sachsen in Dresden, Germany, and, outside Europe, the Khalifa University in Abu Dhabi, United Arab Emirates.

How and why Intermet internationalised its business activities

Intermet began internationalising its business activities in 2004. For Intermet this was a natural thing because some of its products are so specialist that the Polish market is too small for them. Furthermore, Intermet found that working internationally is quite easy, and sometimes customers from foreign countries simply find Intermet themselves through the internet or at trade fairs. Hence, Intermet looks for business partners around the world with a similar vision which could support Intermet in marketing and selling its products and services.

Internationalisation of innovation in Intermet

Practice

Intermet develops international contacts in several ways: through trade exhibitions also in remote cities like Abu Dhabi, through trade companies as well as meetings organised by Polish chambers of foreign trade, Polish embassies, and also trade missions. Intermet finds all this very effective. For example, the contacts to the customer in Indonesia were established at a trade fair in Paris.

Intermet markets its products through Polish trade and consulting companies, also outside Europe. These **representatives** do not only sell Intermet's goods but also feed back ideas for possible new solutions.

Intermet often **customises products**, also for clients outside Europe. For example, the Khalifa University analyses Intermet's products in view of using them in Arabic countries: Critical infrastructure such as oil fields poses special questions, and modular houses may be adapted to accommodating the construction workforce. Intermet also frequently sells products under a customer's name in a foreign country because selling under its own brand in all countries would be too cost-intensive. Furthermore, Intermet refines products from clients.

For Intermet, such internationalisation was and is crucial to flourish. Hence, Intermet will constantly develop its international activities further. Intermet plans to increase marketing and sales in distant markets like Africa or the Middle East together with other Polish companies that have a complementary range of products. This is supposed to broaden the portfolio of potential partners and reduce costs.

Drivers and barriers

Intermet's products determine the country markets which the company targets. Some products, like pirate protection facilities, are only needed in some countries.

When doing business in other continents, the main challenge is **different business cultures**. Intermet found that business partners in Arabic countries require particularly careful communication. Hence Intermet often co-operates with customers through agencies that specialise in certain markets. However, when dealing with developing countries, Intermet found that it is of utmost importance to talk not only to trade companies but also to governmental bodies that are engaged in a given project. Recommendations from Polish authorities are also helpful.

Support to internationalisation

Intermet has taken part in many **government missions**, for example to Middle East countries, together with Vice-Ministers and even the Polish Prime Minister. For developing its business in general and international business in particular, Intermet uses **European funds** – i.e. the Cohesion Fund and the Regional Development Fund – as well as funds from the Polish Agency for Enterprise Development (**PARP**), and the National Centre for Research and Development (**NCBiR**). "For a small company like ours such support is often a key factor", says Ryszard Stachowiak, Intermet's Owner and President. "Without the funds we would not have been able to internationalise our business to an important scale and to internationalise further." He would

certainly use again the support he received and can recommend such support also to other small and medium-sized enterprises.

Impact and lessons learned of internationalising innovation on Intermet

Intermet's international activities have **significantly positive impacts** on the company. "The employment is substantially higher", explains Ryszard Stachowiak. "And it has influenced our quality – not only of the products as such but also their marking, packing, and co-operation with the customers."

There are also some **downsides** of international activities related to higher costs and efforts. Visits to customers are expensive, and staff that speaks foreign languages fluently has to receive higher salaries. Furthermore, international transactions are more complicated, especially in view of their safety, and they require extra time and support from some institutions. For some projects Intermet invested a lot of time and money but they ended up with nothing, for reasons connected with major differences in business culture.

Nevertheless, Ryszard Stachowiak encourages other SMEs to go international. "They should not be afraid to use middle men in the form of international companies to market their products in regions far away where the cultures are quite different from ours."

Lessons learned

- **Establishing contacts through trade exhibitions, trade chambers and embassies**

Intermet uses quite simple ways to establish and develop its international contacts: trade chambers, embassies, trade exhibitions, and trade missions.

- **Cultural differences with foreign countries are a challenge – special agencies can help**

Intermet encounters cultural differences with other countries. Sometimes such differences lead to failed negotiations even after costly and time-consuming efforts. International consultancies and agencies help the company overcome such cultural differences.

- **Using middlemen in foreign countries**

Intermet successfully deals with customers in foreign countries through middlemen in trade companies and consultancies. Intermet sometimes uses their brand to sell in a foreign country in order to save costs.

References

Research for this case study was conducted by Dr. Stefan Lilischkis, Senior Consultant at empirica Gesellschaft für Kommunikations- und Technologieforschung mbH, Bonn, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following:

Primary information

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Intermet: http://www.intermet.pl/en, last accessed 26 April 2016.

Polish Agency for Enterprise Development: http://en.parp.gov.pl, last accessed 26 April 2016.

3.2.5 Kapro Industries, Israel: International activities for incorporating manufacturing in R&D

IN A NUT SHELL	**Kapro Industries performs most of its production and R&D in its home country Israel. However, process innovations and some product innovations have sprung up from its subsidiary in China. Moreover, Kapro often customises its products for specific local markets. These adaptations are done in Israel.**

Abstract

Kapro Industries is a manufacturer and developer of innovative hand tools for the professional and consumer markets. Kapro has approximately 300 employees: roughly 100 in Israel, 150 in China and 50 in the United States. Kapro is headquartered in Kadarim, Israel. Kapro's clients are distributers and retailers in the field of hand and measurement tools. Over 90% of the products are sold outside Israel, in more than 50 countries all over the world. Sales are predominantly made via local distributors. Only in the US, a large market for Kapro, it has an own sales office. Kapro has a production plant in China that is also used as a springboard for sales in China and the whole of Asia. Several local Chinese engineers are employed in the plant. This is because Kapro strongly believes that having R&D engineers close to the production process is a great benefit. These engineers are constantly further optimising the local production processes, and they have also initiated some product innovations that have been taken up by the main office in Israel. Kapro often customises products for local markets and these adaptations are implemented in the plant in Israel. No customisation is (yet) needed for the Chinese market. Kapro does not make use of European support measures, but it has made and does make use of a broad set of national measures designed to support SMEs and R&D activities – most notably assistance from the Chief Scientist Office.

Case study fact sheet

▪ Full name of company:	*Kapro Industries LTD, Kadarim, Israel*
▪ Subsidiaries:	*Kapro Tools Inc. (USA); Kapro China LTD*
▪ Year of foundation:	*1974*
▪ Number of employees (year):	*Approximately 300 (2015)*
▪ Industry sector:	*Hand tools*
▪ Business activity:	*Development and manufacturing of innovative hand tools for the professional and consumer market.*
▪ Activities focused in this case study:	*International product and process development*
▪ Case gatekeeper:	*Shahar Harari, Innovation Manager, Kapro*

Background

Business activity, competitive situation, and importance of innovation

Profile: Kapro Industries is a manufacturer and developer of innovative hand tools for the professional and consumer markets. The firm was founded in 1974 and renamed to Kapro (derived from Kadarim Products) in 1990. Kapro has approximately 300 employees: roughly 100 in Israel, 150 in China and 50 in the United States. Kapro is headquartered in Kadarim, a kibbutz in Israel.[37] The company's US sales subsidiary, Kapro Tools Inc., is located in Lake Mills, Wisconsin. Kapro has a large production plant in Suzhou, China. The company's website states its **main objective** is "to develop and manufacture innovative, professional quality hand tools that make building easier and better".

Kapro's **clients** are distributers and retailers in the field of hand and measurement tools. Some products target professional markets, others do-it-yourself practitioners, while some products are used by both. Kapro works with over 50 countries and sells its products in every continent. 95% of its sales are outside Israel. The US and China are both large markets for Kapro (5 - 10% of total market share each). Other prominent countries are France, Germany, Spain, Poland, and Russia.

Regarding **innovation** activities, Kapro performs most R&D in Israel. This mainly concerns product development and design. Most of its new products are designed at its headquarters. Kapro has collaborated with Israeli universities in the past. This is not standard practice, however, as Kapro usually needs faster development cycles than academics are used to. A small number of employees at the Chinese production plant do some process design, too. Kapro uses different innovation methods, including Systematic Inventive Thinking (SIT), in its innovation process.[38] With its innovative products Kapro has been able to achieve success in a market in which many products resemble commodities. Being able to consistently come up with innovative products is thus of high importance to Kapro's long term strategy.

Kapro's **product** line includes spirit levels, laser levels, layout tools, marking tools and measuring tools. The added value of these products lies in their high-end quality and innovative designs and features, which have been secured in more than 100 patents. A prominent example is *the Plumb Site® Dual-View™ vial* (see Exhibit 1-1). In 1997 it was the first spirit level with a plumb site, i.e. a viewing mirror that makes it easier for the user to set verticals.

Exhibit 4-3-6: Kapro's Plumb Site® Dual-View™ vial

Source: www.kapro.com

How and why Kapro internationalised its business activities

Kapro's international activities concern mainly sales – all over the world but with a subsidiary in the US and production in China. The international approach with regard to sales is more or less common practice for Israeli SMEs, as their home market is relatively small. Kapro has two approaches for selling on foreign markets: either via distributors or via direct sales and marketing. The latter option is preferred because it gives more control but it is also a costly approach. Therefore Kapro only maintains its own sales agents in the **US**, which is a big and important market for Kapro. The main advantage is the reduction of the physical distance to customers, and the fact that sales representatives operate in the same time zone as their client base.

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[37] A collective community in Israel. While they were traditionally based on agriculture, farming has been partly supplanted by other economic branches such as high-tech enterprises.

[38] See http://www.sitsite.com.

The plant in China is first and foremost established for production purposes but the office is also used as a springboard for sales in China and the whole of Asia. Kapro located the plant in China because it is the best place for manufacturing in Asia. There is a readily available network of suppliers and subcontractors which enables the production of high quality goods against the lowest prices. Furthermore, there is the apparent advantage of a huge domestic market.

Internationalisation of innovation in Kapro

Practice

Most of Kapro's R&D happens in Israel. However, three local engineers at the company's Chinese production plant perform some **product and process development**. Process innovations refer to constant improvements in the local production processes of Kapro's products. The Chinese engineers have also developed a number of product innovations, e.g. with regard to a new laser design for plastic products. The factory in China is run by an Israeli manager. The engineers in China collaborate on a day to day basis with the engineers in the R&D headquarters in Israel, using any means of communication tools such as telephone, voice over internet, and e-mail. Furthermore, people from Israel visit the plant in China on a regular, quarterly basis.

Kapro **customises its products to local markets**. The building and construction market is rather traditional and some countries and regions have developed their own particular routines and preferences over time. For instance, in Germany – and only there – foldable rulers are a must. Therefore Kapro has introduced foldable versions for the German market. In a similar vein, in South America levers are used with a specific shape (Y-beams) and Kapro has adapted its products accordingly. For the Chinese market, so far no special adjustments have to be made, so basic products are being used and sold.

The US subsidiary is solely geared towards sales and support. No R&D is done there.

Drivers and barriers

Kapro's main motivation behind its *international* business activities stems from the fact that it wants to be physically close to its clients (US sales subsidiary) and that it wants to lower its production costs (China production subsidiary). Thus there is a **strong economic rationale**. In the case of China, this has resulted in the subsequent hiring of local engineers. Kapro believes that having R&D engineers close to the production process is a great benefit. According to Kapro, the engineers are constantly further optimising the local production processes, and they have also initiated some product innovations that have been taken up by the main office (see above). Hence the innovation activities in China followed from the production process (i.e. a cost reduction rationale), not from an explicit strategy to perform R&D and innovation abroad (i.e. a knowledge sourcing rationale).

The economic rationale has also been a driver to hire local (Chinese) engineers, as these have **lower labour costs** than engineers from Israel or most European countries or the US.

The localisation of the production plant in China has not been driven by the need to customise products for the local Chinese market, as final products are not customised for the Chinese market (see also above). All customisations, for example the ones for the German and South American market, are made in the Israeli plant.

In the interviews for this case study, **no explicit barriers were mentioned with regard to internationalisation**, except of some issues with cultural differences. Developing good communication with customers, suppliers and international employees proved to be a challenge due to different mentalities, behaviour and languages. Physical distance between the headquarters on the one hand as well as foreign staff and customers on the other hand is a hurdle. If there were no cost issues, Kapro would operate many more local sales agencies. However, cultural differences are no really big issue. The company deals with the physical (and time) distances in a pragmatic manner which seems to work well: In nearly all markets, local distributors handle communication, and part of the cultural differences expressed in local ways of working in building and construction

are embodied in customised products. Furthermore, the Chinese plant is headed by an Israeli expat.

Public support to internationalisation

Although firms from Israel are eligible for EU R&D funding, and many Israeli firms actually have received funding, Kapro does not participate in the European Union's Framework Programmes or in other European R&D support measures.[39] However, Kapro does receive the full range of R&D support provided by Israel's Ministry of Industry, Trade and Labor (MOITAL), which is managed by the **Office of the Chief Scientist** (OCS). OCS is the support arm of the ministry charged with fostering the development of industrial R&D within Israel.

Although Israel has a fiscal policy that allows up to 40% of R&D expenditures to be tax deductible, most measures take the form of direct grants. One prominent measure named by Kapro is the **R&D Fund**, which reduces the risk of performing R&D by providing 20 – 50% of the costs of a project.[40] In return, Kapro pays royalties if the project succeeds. Kapro has also received some support by the Office of the Chief Scientist in export and marketing activities; mainly by providing funding for Kapro's presence at fairs and exhibitions abroad. The Israeli embassies provide assistance in establishing and developing international business partners.

Another effective policy instrument from MOITAL that Kapro mentioned was **Global Enterprise R&D Cooperation Framework**. This programme encourages large multinationals to forge alliances with Israeli start-ups. This is accomplished via strategic cooperation agreements between the State of Israel and foreign multinationals, such as Alcatel, IBM, Intel, HP, Coca Cola and General Electric.[41]

Impact of internationalising innovation on Kapro and lessons learned

Impact

Kapro sells over 90% of its products abroad and is thus very much dependent on international markets. It has successfully adapted its products to local markets by implementing various customisations to its products. The production plant in China was mainly set up for economic reasons, i.e. lower production costs. The production activities in that plant have led to subsequent RDI activities but this has not resulted in local customisations of the final products. It has however resulted in some changes and additions to the basic range of final products.

Except for the plant in China and the sales agency in the US, all activities from Kapro have remained in Israel, although most staff are located abroad. Hence Kapro is able to sell its products worldwide without having strong local presence in target markets. For its sales it relies on its vast network of local and regional distributors. It has taken Kapro several decades to build and steadily expand this global network of distributors.

[39] Israel is the only non-European country fully participating in the European Union's Framework Programme (FP). ISERD, the Israel-Europe R&D Directorate for the FP, also operating through the Office of the Chief Scientist.

[40] See http://www.investinisrael.gov.il/NR/exeres/1D1F23F8-20CF-4548-B253-EAFB3FE288AF.htm

[41] See MOITAL (2015). R&D Incentive Programs. http://www.moital.gov.il/NR/rdonlyres/5E7A4322-4D0F-4320-953C-83F94024E7AA/0/RDspreads.pdf

Lessons learned

- **A network of local distributors may be sufficient for world-wide sales**

Neither local physical presence nor sophisticated technologies are required to sell products worldwide. Instead Kapro relies on its network of local distributors which it has steadily expanded over a long period of time. This network also fed Kapro with knowledge about the specific needs in local markets which led to subsequent customisation of the basic portfolio of final products. No local production or R&D facilities are needed to implement these customisations – this is all being done from Israel. However, Kapro's products are medium tech not high tech.

- **Production in foreign countries may support process and product innovation**

Local production activities (the Chinese plant) have led to subsequent innovation activities, not only resulting in process innovations (optimisation of local production processes) but also in product innovations (changes to the basis range of final products). This "upgrade" from non-innovative production activities into process innovations and in turn in product innovations has occurred despite the fact that the prime driver for establishing the local Chinese plant was an economic rational (reduction of production costs).

- **Some firms may seek support only from national sources**

Kapro has made a lot of use of national R&D support schemes but it has not participated in EU programmes, despite the presence of a dedicated bridging institute for Israeli-EU R&D collaboration (ISERD). Some firms may, like Kapro, first and foremost orient themselves to local (national) government support and the subsequent step to the European level is not self-evident.

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Research for this case study was conducted by Robbin te Velde, principal researcher at Dialogic Innovation & Interaction, Utrecht, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following:

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Last accessed 23/10/15.

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http://www.investinisrael.gov.il/NR/exeres/1D1F23F8-20CF-4548-B253-EAFB3FE288AF.htm. Last accessed 7/12/15.

MOITAL (2015). R&D Incentive Programs. http://www.moital.gov.il/NR/rdonlyres/5E7A4322-4D0F-4320-953C-83F94024E7AA/0/RDspreads.pdf. Last accessed 7/12/15.

Databases

CORDIS database with participants in FP7 programmes (for assessing presence of Israeli firms).

3.2.6 KeyGene, the Netherlands: Internationalising innovation activities to the outside and inside

IN A NUT SHELL	**KeyGene, the Netherlands is an Agro biotech company that provides research for crop improvement. The company has a subsidiary in the US and a large share of employees from other countries, and it customises services for each client. In doing business abroad it benefits from embassies, European associations, and trade delegations.**

Abstract

KeyGene's main business is strategic and applied research in the field of natural genetic variation in vegetables and other crops. It has 135 employees and is based in the Netherlands. Founded in 1989, the company strengthened its international activities when a new CEO came into office in 2004. The CEO found it very important to internationalise not only to the outside but also to the inside. Towards the outside, he established a subsidiary in the US and a partnership with an R&D institute in China. Towards the inside, he hired more employees from foreign countries and established English as the company's main internal language. The biggest challenge for KeyGene anywhere in the world is regulation. Protectionism and a lacking respect for intellectual property are further challenges in some countries. KeyGene receives helpful support to its international activities from its shareholders, from Dutch embassies, and from European business associations. The company also benefited from several international trade delegations. Furthermore, KeyGene took part in publicly co-funded European research projects. Internationalising innovation in this way had a significantly positive impact on the company: the turnover, the number of employees and the number of patents all resulted in a strong increase.

Case study fact sheet

▪ *Company name:*	*KeyGene (http://www.keygene.com)*
▪ *Subsidiaries:*	*KeyGene USA, Rockville (Maryland)*
▪ *Year of foundation:*	*1989*
▪ *Number of employees:*	*135*
▪ *Turnover:*	*Close to 20 million Euro (2015)*
▪ *Industry sector:*	*Agricultural biotechnology*
▪ *Business activity:*	*Strategic and applied research in the field of natural genetic variation in vegetables and other crops*
▪ *Activities focused in this case study:*	*Internationalising innovation to the outside (through a subsidiary and customised services) and inside (through employees from many countries and making English the main language)*
▪ *Case gatekeeper:*	*Arjen van Tunen*

Background

Business activity and competitive situation

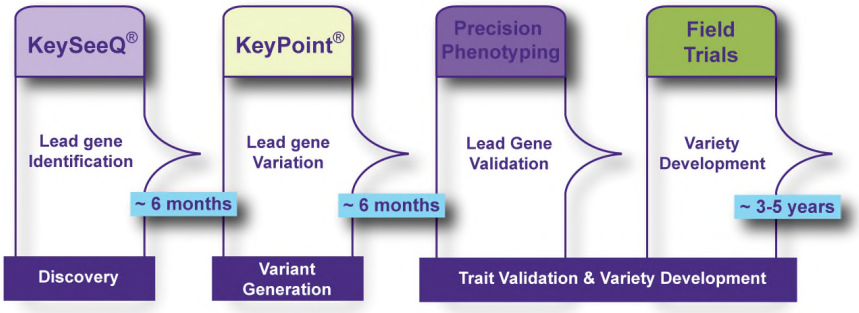
Profile: KeyGene calls itself a "crop innovation company"[42] and is based in Wageningen, the Netherlands. The company's main business is strategic and applied molecular genetic research in vegetable, field and ornamental crops. A number of Dutch seed companies founded KeyGene in 1989, with the goal to "create synergy and higher efficiency in their molecular genetic research programs".[43] KeyGene started with three employees and today has 135. The company has four large strategic shareholders from the vegetable breeding business: Enza Zaden (Netherlands), Rijk Zwaan (Netherlands), Vilmorin & Cie (France), and Takii & Co. (Japan).

According to the company's self-description, "KeyGene assists breeding companies all over the world with their crop development, by providing cutting-edge breeding technology and trait improvement platforms."[44] KeyGene considers itself as the **market** leader in its field of business and has the objective to sustain this position. It seeks further gradual growth in a gradually growing market. KeyGene's CEO Arjen van Tunen sees Europe in a leading position in crop innovation. Other parts of the world, in particular China, India and Brazil, are "agro super powers which are a perfect outlet for our technology".

KeyGene's four strategic shareholders are also the company's main **customers**. Other customers are major companies in the field crop and ornamental seed industry. On the **competitors**' side there are a number of knowledge providers, including universities, mainly in the US but also in Israel and Europe. It has become a problem for KeyGene that governments increasingly require universities to commercialise their research findings. From KeyGene's point of view, this sometimes leads to false competition when universities offer commercial services for distorted prices and infringe patents.

KeyGene's business is **innovation**. The company has developed several registered technologies which are used in its research for improved crops – see Exhibit 1-1 for an example, the KeyPoint® technology. KeyGene sees a necessity for continuous innovation in food production.

Exhibit 1-3-7: KeyGene's KeyPoint® Mutation Breeding technology



Source: http://www.keygene.com/products-tech/keypoint/

One of its basic assumptions is a need to increase efficiency in growing crops to meet challenges such as an increasing world population while availability of land and clean water is shrinking.

How and why KeyGene internationalised its business activities

KeyGene switched to substantial international activity when the current CEO joined the company in 2004. He believed that the company needed an innovation boost and that this had to go together with internationalisation. In 2005 the new CEO launched a subsidiary in Rockville in the East of US, close to Washington D.C. Moreover, KeyGene today collaborates with a Joint Lab at the Shanghai

[42] Quote from http://www.keygene.com/about-us/.

[43] See http://www.keygene.com/about-us/.

[44] See http://www.keygene.com/about-us/.

Institute of Biological Sciences in Shanghai, China. According to its corporate brochure, "KeyGene is constantly looking for new opportunities to collaborate with both industry and academic world", in principle in all parts of the world.

Internationalising innovation at KeyGene

Practice

KeyGene internationalised to the outside and to the inside. Towards the **outside**, KeyGene has a subsidiary in the US, a formal R&D partner in China and more or less strong contacts with many other research institutes in different parts of the world. The US subsidiary has ten employees. It was established because of the large amount of R&D investments done in the US – KeyGene sought to take its share. Its CEO, Arjen van Tunen, explains, "you can only benefit from it when you are in the middle of it". KeyGene is involved in many R&D projects in the US. Basically, the operations of the US subsidiary are the same as its headquarters in the Netherlands, but the US branch is more focused on crops that are prominent in the US.

Furthermore, KeyGene **customises** its services to every single client. KeyGene helps them "improve their crops", as Arjen van Tunen says, depending for example on the type of crops, demands from the customer's R&D department, and the customer's level of advancement.

To the **inside**, Arjen van Tunen changed the main language within the company from Dutch to English soon after he went into office. The company also looks for experts internationally. Approximately a quarter of the employees are foreigners. Some come from countries outside Europe, like the US, Brazil, as well as Nepal. Arjen van Tunen seeks new ideas and creativity and attracting the best workers possible. An objective that KeyGene still seeks to fulfil is having at least one of the four board positions taken by someone not born in the Netherlands.

Challenges to internationalisation

For KeyGene, due to its field of business, the biggest challenge anywhere in the world is **regulation**. Arjen van Tunen considers the EU administration not as particularly better than governmental institutions in other parts of the world. For example, according to him, EU regulation about new breeding technologies has been pending for a long time and the industry is waiting for a decision. Similar issues apply in Japan. Some other countries like the US, China and also Argentina have so far been more decisive. Arjen van Tunen states that a faster, better, and knowledge-based decision process in the EU would increase competitiveness of the rather few companies in his field of business which remain in Europe.

Another issue that applies to several key countries is **protectionism**. Since food security is an important issue in China and India, both countries protect their seed industries. This makes it difficult to become partners. For example, a foreign investor cannot take the majority of shares in a Chinese seed company.

Furthermore, **respect for intellectual property** (IP) is low and still developing in some countries. This is a crucial issue for KeyGene because the company's products are intangible. Hence, KeyGene is cautious with introducing its most innovative services to countries with a generally low respect of IP.

Support to internationalisation

KeyGene receives support to its international activities from several organisations. First of all, the company's **shareholders** help internationalise, the Japanese shareholder in particular. Second, KeyGene frequently uses support from the **Dutch embassies** in its international activities, particularly when seeking to enter new markets. KeyGene finds this support very helpful. "Each time I go to China, I am having an appointment with the embassy or consulate", says van Tunen.

Trade delegations are another helpful means of internationalisation. KeyGene was part of several Dutch delegations to countries outside Europe, for example to China, India, and Brazil. Arjen van

Tunen says that trade delegations organised by the EU may potentially also be helpful, but only if they are designed for specific industries, specific thematic areas and going to the largest countries.

He also considers related **European associations** as very helpful, i.e. EuropaBio and the European Seed Association which are dealing with KeyGene's type of business. Furthermore, KeyGene has been partner in many helpful **European research projects**.

Impact and lessons learned

Impact

Internationalisation had a **significantly positive impact** on KeyGene. Turnover tripled from around 6 million Euro in 2004 to almost 20 million in 2015. In the same period of time, the number of employees grew from 80 to 135. The company's intellectual property position also improved: In 2004, the company only had a few patents; today it has over 500, half of them granted, and >50 patent families.

While internationalisation generally had positive impacts, KeyGene also faced **drawbacks**. The company planned to establish two subsidiaries, one in the US and one in China. While the US subsidiary is operating well, a subsidiary in China has not yet been established. This is also due to differences in doing business and the way in which intellectual property is handled. These are issues other companies in other fields of business may also have to be aware of when going abroad.

Lessons learned

- **Internationalising not only to the outside but also inside**

KeyGene is an example of a company that internationalised both to the outside (through a subsidiary in the US and an R&D partner in China as well as customising services for each client) and to the inside (through hiring experts from other countries and using English as the company's main language). Both may be necessary for successful international innovation activities.

- **Seeking support from national embassies and European associations**

In its international activities, KeyGene receives support from the Dutch embassies in countries outside Europe and from European business associations. It participates in trade delegations to foreign countries and considers this support as very helpful and recommendable.

- **Regulation may be key barrier to internationalisation**

In KeyGene's case, regulation is the predominant barrier to doing business anywhere in the world. Some countries are, however, more decisive about regulation which increases competitiveness of the companies based in these countries. This may not only apply to agro-biotechnology.

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Research for this case study was conducted by Stefan Lilischkis, Senior Consultant at empirica GmbH, Bonn, Germany, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following.

Interviews

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3.2.7 LifeTec, the Netherlands: Customising innovative services in medical testing for international clients

IN A NUT SHELL	**LifeTec's mode of internationalising innovation activities is to customise its testing methods to the customers' specific needs. LifeTec can recommend other SMEs to take part in foreign trade missions and in European research projects to develop international business activities.**

Abstract

LifeTec Group is a contract R&D company doing compliance and efficacy studies of innovative healthcare products, interventions and therapies. The company has 14 employees and is based in Eindhoven, the Netherlands. Its clients are enterprises from the biomedical industry as well as clinics and research institutes. While most clients are from Europe, LifeTec has also customers and contacts in Israel, the US, Saudi-Arabia, Indonesia, and Brazil. LifeTec applies innovative testing methods and is continuously developing these methods further. In the vast majority of assignments, LifeTec customises its testing methods to the customers' specific needs. This can be considered LifeTec's mode of internationalising innovation activities. LifeTec does not co-operate with partners outside Europe for offering its services. LifeTec is on the brink of growing considerably and is thus seeking to establish more and deeper relationships with clients outside Europe. A barrier is that clients want to be present when tests take place, which requires long-distance travel, consuming considerable time, money and effort. In order to diminish such hurdles, LifeTec is planning to implement virtual presence tools and an online portal for participants. Foreign trade missions and participation in European research projects helped LifeTec develop its international networks and business.

Case study fact sheet

▪ *Full name of company, headquarters location town, country:*	*LifeTec Group BV, Eindhoven, the Netherlands*
▪ *Legal form:*	*Private company*
▪ *Subsidiaries:*	*LifeTec Group BV is the subsidiary of LifeTec Group Holding BV*
▪ *Year of foundation:*	*2004 (as "Hemolab"); renamed to LifeTec Group in 2012*
▪ *Number of employees (year):*	*14 (2015)*
▪ *Budget in most recent financial year:*	*n.a.*
▪ *Industry sector:*	*Medical services*
▪ *Business activity:*	*Contract R&D; carrying out compliance and efficacy studies of innovative healthcare products, interventions and therapies*
▪ *Activities focused in this case study:*	*Customisation of services for international clients*
▪ *Case gatekeeper:*	*Lars Mulder MSc PhD, Manager Orthopaedics*

Background

Business activity, competitive situation, and importance of innovation

Profile: LifeTec Group is a contract research and development (R&D) company doing compliance and efficacy studies of innovative healthcare products, interventions and therapies. The company has 14 employees and is based in Eindhoven, the Netherlands. It is a spin-off from Eindhoven University of Technology, founded in 2004 under the name "Hemolab". In 2012 it was renamed LifeTec Group.

The company's **clients** are enterprises from the biomedical industry – from small and medium-sized enterprises (SMEs) to large multinationals – as well as clinics and research institutes. The clients' fields of activity are medical devices, biomaterials, pharmaceuticals, and regenerative medicine. The clients are mostly in, but not limited to, the cardiovascular and orthopaedic field. While most clients are from Europe, LifeTec has also customers and contacts in Israel, the US, Saudi-Arabia, Indonesia, and Brazil. For LifeTec it does not matter where the clients are from.

LifeTec's principal **business objective** is to grow the company. The target is to double in size over the next five years. However, LifeTec does not only seek growth in terms of numbers of employees and turnover but also in terms of influence on standards for pre-clinical studies. Potential clients are meant to think of LifeTec when they require the kind of services LifeTec offers. Currently, LifeTec's market share is small.

There are two important **developments in LifeTec's market**: First, the customers toward whom LifeTec is oriented develop plenty of innovative products, which require consistently new innovative test methods. Second, societal pressure on animal experimentation has increased the demand for alternative experimental methods. Both trends make innovation very important in LifeTec's market. The company perceives its strengths in being innovative, fast, and flexible. LifeTec is continuously developing its **innovative testing methods** further, combining "the latest developments in tomographic imaging technology with morphometric and finite element algorithms".[45]

For example, LifeTec uses an isolated beating heart platform (Physioheart®) based on slaughterhouse animal tissues. The platforms allow performing any cardiological, surgical or minimally invasive intervention on the heart during preparation, before reviving the heart and connecting to the mock fluid circulatory systems and during functioning (see Exhibit 1-1).

Exhibit 5-3-8: LifeTec's beating heart platform for medical testing

Source: http://lifetecgroup.com/technology/rd-models/physioheart

How and why LifeTec internationalised its business activities

LifeTec found its clients outside Europe because they learned about LifeTec's services and established contacts with LifeTec. LifeTec has so far not applied specific marketing activities. Contacts developed through international research and development projects with partners all over

[45] Quotation from http://lifetecgroup.com/technology/imaging-facilities/microct-and-nanoct/.

Europe. "Step by step, the network grows", says Lars Mulder, Manager Orthopaedics at LifeTec, "and leads to business assignments also beyond Europe."

Internationalisation of innovation in LifeTec

Practice

In approximately three quarters of assignments, whether they are inside or outside Europe, LifeTec **customises its testing methods** to the customers' specific needs. This can be considered LifeTec's mode of internationalising innovation activities. LifeTec co-operates with partners outside Europe in research projects and also with sales agents. Within Europe LifeTec has a major innovation partner in Paris, France. Successfully completing assignments with customers outside Europe were important milestones for LifeTec – particularly when these customers returned.

Drivers, barriers and solutions

LifeTec began to develop business contacts outside Europe upon founding in 2004 as HemoLab. The **motivation** was that it was important to grow the company through gaining more clients and influence in the market. It was an obvious step to go beyond European borders: While Europe is home to some large enterprises who are potential clients for LifeTec, many relevant enterprises are based outside Europe or have their R&D departments located outside Europe.

The most important **barrier** to internationalising innovation activities is distance. LifeTec does its experiments in-house but clients want to supervise the process. Hence they need to send personnel to LifeTec's laboratories in the Netherlands, implying long-distance travel. This requires considerable time, money and effort on the part of the clients. In order to alleviate this issue, LifeTec plans to implement a virtual presence, allowing the client to virtually join the tests and comment on the process. Furthermore, LifeTec plans to implement a protected online portal for participants to facilitate sharing information with them.

A further challenge, also related to distance, is to **maintain relationships** with partners in non-European countries. Opportunities to meet personally in labs, at conferences or trade exhibitions or to carry out joint projects are weaker when partners are outside Europe. Hence it is more difficult to keep clients informed and up to date with developments in the company. LifeTec considers the planned online portal to be part of the solution. Furthermore, the company plans to introduce a newsletter.

A further barrier is **cultural differences**. For example, dealing with potential clients in Saudi-Arabia initially for LifeTec meant dealing with intermediate agents, not directly with the client. This makes the business relationship more complex and somewhat uncertain. At first one does not know how serious the potential client is. Another example is Israel, where considerable innovation in the field of medical technology is taking place. Hence there are many potential clients for LifeTec. However, interlocutors are very restrictive with unveiling information about their technology until they eventually return with a concrete inquiry for an assignment. This makes it difficult to figure out and offer customised solutions at an early stage of communication. In both these exemplary cases, Saudi-Arabia and Israel, the solution is just holding on and always behaving like serious business partners.

Public support

LifeTec's most remarkable participation in a public support measure to internationalise its business was joining a **trade mission** to Indonesia. "This got many things rolling", says Lars Mulder. "It brought us good contacts we would not have accessed otherwise." The trade mission was organised by the Netherlands Enterprise Agency (Rijksdienst voor Ondernemend Nederland, RVO) commissioned by the Ministry of Economic Affairs. According to Mulder, RVO is very active in helping Dutch enterprises internationalise their business, and they have many good contacts abroad. LifeTec was invited to take part in this mission because clinical partners with good contacts

to the government recommended LifeTec. Hence, LifeTec did not search for this opportunity – it came to them.

Furthermore, LifeTec participated in several **Framework Programme** projects co-funded by the European Commission. For LifeTec, such projects are very important to establish and expand international contacts. Lars Mulder says that LifeTec would certainly take part in trade missions and international R&D projects again and can recommend other innovative SMEs to do so, too.

Impact of internationalising innovation on LifeTec and lessons learned

Impact

Internationalising its innovation activities contributed decisively to LifeTec's business objectives: It enhanced customer relationships, supported the company's growth, and helped reach the standard-setting level that LifeTec is seeking. So far the company had no failures in its business assignments beyond Europe. Lars Mulder adds that such international activities definitely also imply more work.

Lessons learned

- **Use governmental agencies for finding contacts abroad**

Lars Mulder from LifeTec recommends other SMEs to actively search for and contact governmental agencies that have agents and networks abroad. These agencies may facilitate getting in touch with valuable business contacts in countries outside Europe.

- **SMEs should actively seek participating in trade missions**

Specifically, SMEs may need to consider that governmental agencies actively search for the right partners to take on trade missions. It may thus be worthwhile for SMEs which seek to take part in trade missions to make themselves known at such agencies.

- **EU research projects can help build up international networks**

Furthermore, innovative SMEs that have not yet been involved in European research projects should consider the benefits of such projects for expanding and deepening their international networks. Participating in such projects may also act as a springboard towards outside Europe.

References

Research for this case study was conducted by Dr. Stefan Lilischkis, senior consultant at empirica GmbH, Bonn, Germany, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following:

Interview

Lars Mulder, MSc PhD, Manager Orthopaedics, LifeTec Group (on the phone, 1st September 2015).

Websites

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3.2.8 NUMECA, Belgium: International research cooperation to ensure cutting-edge insights in Computational Fluid Dynamics

IN A NUT SHELL	**NUMECA's principal mode of internationalising innovation activities is using a wide international network of research institutes to source new expertise in its field of technology. This also includes hiring foreign academic staff. Furthermore, NUMECA has sales and service centres in foreign countries.**

Abstract

NUMECA is a spin-off from the Vrije Universiteit Brussel (VUB) that develops dedicated software in the field of Computational Fluid Dynamics (CFD). The firm has roughly 130 employees and is based in Brussels. 95% of its customer base consists of research institutes and companies located outside of Belgium in a wide range of sectors. NUMECA's added value lies in its innovative R&D and expertise in CFD. NUMECA's main R&D activities are located in Belgium. However, in order to be up to date on any recent developments in its field, NUMECA has a wide global network of research institutes that it cooperates with. These institutes develop new insights on CFD, after which they are commercialised by NUMECA. This network thus functions as a tool to increase NUMECA's absorptive capacity with regard to international developments, which in turn helps NUMECA in developing new expertise. This can be considered NUMECA's special way to internationalise innovation activities. The Framework Programmes have been of great benefit to NUMECA by allowing them to focus more on long-term R&D and by helping NUMECA to identify new R&D partners. NUMECA does not perceive any barriers here; its largest barrier to growth is the limited availability of skilled personnel. NUMECA uses its global network to find potential candidates. The company also has several subsidiaries for sales and service in foreign countries.

Case study fact sheet

▪ *Full name, headquarters location, country:*	*NUMECA International NV, Brussels, Belgium*
▪ *Legal form:*	*Public limited company*
▪ *Subsidiaries:*	*NUMFLO, NUMECA China, NUMECA India, NUMECA Japan, NUMECA USA*
▪ *Year of foundation:*	*1993*
▪ *Number of employees (year):*	*115 – 150 (2015)*
▪ *Budget in most recent financial year:*	*n.a.*
▪ *Industry sector:*	*ICT*
▪ *Business activity:*	*Development of innovative Computational Fluid Dynamics (CFD) software*
▪ *Activities focused in this case study:*	*Cooperation with international research institutes*
▪ *Case gatekeeper:*	*Marc Tombroff, General Manager NUMECA*

Background

Business activity and competitive situation

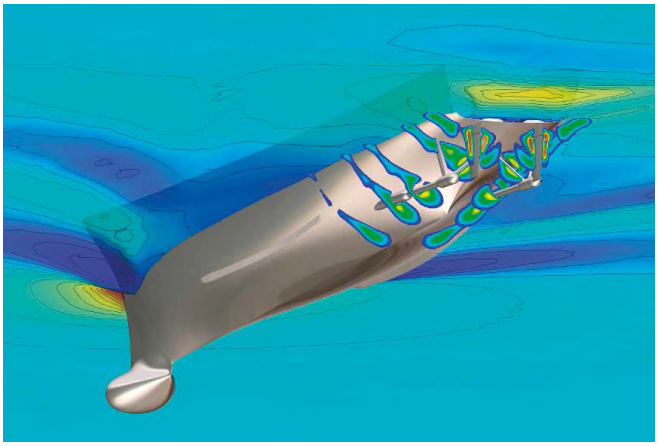
Profile: NUMECA International develops specialised software in the field of Computational Fluid Dynamics (CFD).[46] It was founded in 1993 as a result of successful research within the department of Fluid Mechanics at the Vrije Universiteit Brussel. NUMECA's product strategy is based on the development of customised software systems for rapid simulation, design and optimisation. NUMECA has approximately 130 employees, of which 85 are in Belgium, and it is growing fast. Its Belgian offices are located in Brussels and Mons. NUMECA has subsidiaries in China, India, Japan, and the US and a number of distributors all over the world.

NUMECA's **clients** are both research institutes and companies that work with fluid simulations. As this is an expertise needed within multiple sectors, NUMECA's clients range from aerospace to automotive, marine, power and propulsion, hydro turbines, wind energy, oil and gas, architecture, and healthcare industries. 95% of these customers are located outside of Belgium; 40% in Europe, 30% in the USA and 30% in Asia. NUMECA is a worldwide player in its field and, according to NUMECA, one of three main developers of high-end CFD systems.

The main added value of NUMECA (and any other successful player in this field) is the level of innovation of its products because the clients are very knowledge intensive organisations. Performing **R&D** is thus essential for growing and maintaining success. In order to do so, NUMECA needs to attract highly skilled engineers and scientists; they come from more than 20 countries. The company also maintains an extensive international network for scientific collaboration. NUMECA names the development of top-of-the-line innovative software and customer satisfaction as its **main objective**.

Although NUMECA sells its **products** off the shelf, it does customise its software for specific industries. An example is FINE/Marine, an integrated CFD software environment for the simulation of mono-fluid and multi-fluid flows around ships (see Exhibit 1-1). NUMECA also has a global network of sales service centres to provide local support to its customers.

Exhibit 6-3-9: FINE/Marine: An application of NUMECAs CFD expertise



Source: www.numeca.be

How and why NUMECA internationalised its business activities

NUMECA collaborates with an extensive network of international universities and research centres, most of them in Europe, some in USA, which informs the firm about the most recent advances in the area of Computational Fluid Dynamics. **Absorptive capacity** is the key concept behind these collaborations. However, NUMECA does not perform R&D activities outside Belgium, with a minor exception of some small activities in the US. The complex nature of the kind of R&D being performed within NUMECA requires local presence of researchers. Offshoring is thus not suitable for

[46] CFD is „a branch of fluid mechanics that uses numerical analysis and algorithms to solve and analyze problems that involve fluid flows", see https://en.wikipedia.org/wiki/Computational_fluid_dynamics.

the type of software that NUMECA develops. Moreover, NUMECA's employees have enough expertise to develop innovations on their own.

Internationalisation of innovation in NUMECA

Practice

In all international collaborations that NUMECA participates in, the general way of working is the same. **Universities or research centres bring expertise or perform R&D, which is then industrialised and commercialised by NUMECA**. NUMECA uses these partnerships to actively absorb additional and new scientific insights from abroad, which is then integrated in NUMECA's own R&D in Belgium. Depending on the nature of the collaboration, universities receive fees or royalties in exchange of the rights to sell and commercialise the technology. In many cases, international universities have also become users that work with NUMECA's developed products. This way of working has been very useful for NUMECA, which makes changes to these activities in the near future unlikely.

Drivers and barriers

Essential to the success of NUMECA is its ability to maintain the cutting-edge expertise needed for taking on any international competitor. Since most developments in the field of CFD take place outside Belgium, NUMECA has a clear **motivation** for cooperating with international research institutes.

NUMECA's internationalisation strategy has two sides. Firstly, it needs to absorb worldwide insights in the field of CFD to stay competitive, as described above. The **rationale** for selecting certain countries and partners to work with on innovation is merely based on where most expertise can be found. NUMECA simply follows the knowledge it needs, by actively scanning its field for new developments. Secondly, NUMECA has its network of international sales and service centres. These centres are established in locations where NUMECA has or expects to grow a large customer base.

NUMECA says it is not experiencing **barriers** to its internationalisation activities. Its cooperation with research institutes is going well, and common barriers for the internationalisation of R&D are not relevant since NUMECA is not performing R&D outside Belgium.

Currently, a major challenge for NUMECA is a lack of talented, reliable and highly skilled **fluid mechanical engineers.** The firm is therefore constantly looking for highly-educated researchers and engineers in fluid mechanics, regardless of their origin and home base. Such people are identified via conferences and collaborations with universities. NUMECA is also proactively contacted by potential candidates due to its reputation. Moreover, NUMECA uses its local branches to look for talented engineers. In all cases, NUMECA aims to move such highly skilled potential candidates to its Belgian offices. The limited supply of skilled engineers is the main bottleneck for NUMECA's further growth. All of its engineers are fully occupied with current operations, which means new products (e.g. new functionalities, features and adaptations to other industries) can only be developed when new people are hired.

Public support to internationalisation

Charles Hirsch, emeritus professor for fluid mechanics at the Vrije Universiteit Brussel, was already active in **EU research programmes** before the founding of NUMECA. Consequently, NUMECA has been participating in EU Framework Programmes from the very start. NUMECA is still very active in these programmes, specifically in the EU-China research collaboration programmes. The links with these Chinese partners were already established prior to the joint participation in the projects.

NUMECA deems its participation in EU research programmes as extremely useful and critical to its success. It has allowed NUMECA to look for and team up with R&D partners, which has been essential in obtaining new insights about fluid dynamics. The EU research programmes provide NUMECA, as an SME, with the possibility "to 'escape' from daily operations; to venture into longer

term, more uncertain and strategic R&D trajectories". It also provides very efficient mechanisms to find new partners, according to NUMECA. Often these lead to long-standing relationships that continue after the projects end. Finally, these programmes help by forcing NUMECA to make its own business and research plans clear and explicit. For all these reasons, NUMECA will further participate in Framework Programmes.

NUMECA also receives (limited) support from the regional Belgium government. Grants from the US, for instance, would require establishing a branch in the US with more than 50% US ownership. This does not fit NUMECA's home-based strategy. However, NUMECA indirectly benefits from the foreign (research) grants to international academic partners in its global scientific network.

Impact of internationalising innovation on NUMECA and lessons learned

Impact

While NUMECA does not perform any R&D outside of Belgium, it greatly benefits from persistently absorbing new recent insights and expertise in Computational Fluid Dynamics. It is of major importance to NUMECA's worldwide competitive position that its knowledge on CFD is cutting-edge. By cooperating with international research institutes, NUMECA continuously reinforces this position.

Lessons learned

- **An SME can benefit from many different ways of internationalising innovation**

NUMECA is a showcase of four types of internationalising innovation activities: First of all continuously sourcing new knowledge from an international network of research institutes, which may include, secondly, purchasing or licensing of internationally developed intellectual property. Thirdly, hiring skilled employees through the international network; fourthly using international subsidiaries and distributors.

- **Ensuring high absorptive capacity is crucial for an R&D-driven company**

For an innovative SME such as NUMECA, charging foreign institutes with specific R&D tasks or even establishing subsidiaries for R&D is not essential. As it has deep expertise in its field itself, ensuring a high absorptive capacity for the latest developments in its discipline is more than enough.

- **Benefit from EU research programmes: links with international organisations**

Public support initiatives such as the European research Framework Programmes thus do not necessarily have to enable direct international innovation in order to create added value; creating links with other international organisations can already have great indirect added value. This might be a useful insight for policy makers as well as for other SMEs.

References

Research for this case study was conducted by Robbin te Velde, principal researcher at Dialogic Innovation & Interaction, Utrecht, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following:

Interview

- Marc Tombroff, General Manager, NUMECA, via Skype, 6th of October 2015.

Websites

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3.2.9 poLight, Norway: Marketing an innovative autofocus technology with key partners in Asia

IN A NUT SHELL	**poLight offers a new autofocus technology for micro lenses in mobile phones and cameras. Since major customers are located in East Asia, the company builds parts of its value chain with partners in Taiwan, China, Korea, and Japan. It needs to manage challenges related to distance, mentalities, and language.**

Abstract

poLight developed and offers an innovative autofocus technology for micro lenses in mobiles phones and cameras, targeting a multi-million market. The venture-backed company is based in Norway and has currently around 25 employees. A large part of the employees are from outside Norway, seeking to attract the best staff available. Founded in 2005, poLight internationalised its business and innovation activities right from the start. Major customers are the large mobile phone and camera manufacturers which are located in East Asia, increasingly concentrating in China. In order to build the value chain close to them, specifically the assembly part, poLight established its value chain with partners in Taiwan, China, Korea and Japan. Partners in East Asia were also found to offer a good value for money, i.e. excellent technological skills in combination with reasonable costs for testing, designing and manufacturing. On establishing its partner network in East Asia, poLight encounters difficulties related to distance, mentalities and language. However, the benefits of the Asian partners outweigh the costs. Another major partner that develops a certain piece of the product is located in Italy. While poLight occasionally uses some support from governmental agencies, the company found its foreign partners through its network of experts. Participating in international research projects was very conducive for expanding this network.

Case study fact sheet

▪ *Name of company and locations:*	*poLight AS (http://polight.com), Horten, Norway (headquarters); set-ups in France, China, Korea, Japan*
▪ *Year of foundation:*	*2005*
▪ *Number of employees:*	*25*
▪ *Budget in most recent financial year:*	*n.a.*
▪ *Industry sector:*	*Optoelectronics*
▪ *Business activity:*	*Developing, producing and marketing a new autofocus technology for micro lenses*
▪ *Activities focused in this case study:*	*Engaging in different kinds of international relationships with several countries in East Asia*
▪ *Case gatekeeper:*	*Pierre Craen, Chief Technology Officer, poLight*

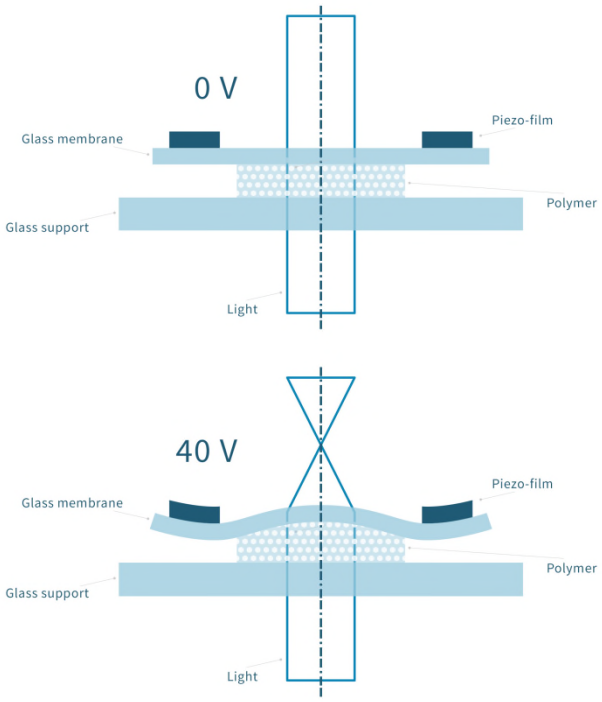
Background

Business activity and competitive situation

Profile: poLight is based in the Norwegian city of Horten. Aiming to replicate the human eye lens, the company has "developed the fastest focus actuated lenses on the market"[47]. It is in the final stage of introducing products to the market for mobile phones and cameras. The company was founded in 2005 with research originating from SINTEF, a large Norwegian non-profit research organisation.[48] Today, the company has around 25 employees.

The company's first **product** is the TLens® Silver, which became ready for customer projects in late 2015. This product is, according to poLight, extremely small in size as well as faster focusing and less energy-consuming than competitive technologies. It also has no magnetic interference. A piezoelectric element – "piezo" referring to electric charge caused by pressure – is placed on a thin glass membrane with a patented polymer sandwiched in two glass layers. The functioning is that the piezo material deforms the polymer when a voltage is applied.[49] See Exhibit 1-1.

Exhibit 1-3-10: The principle of poLight's TLens® product



Source: http://polight.com/technology/how-does-it-work

Autofocus technology is a multi-million **market** worldwide. The main competitive and incumbent technology is voice coil motors (VCM). poLight considers VCM as bulky and performance limited and its own technology as superior. According to poLight, the market has so far not really been characterised by **innovation**. The VCM technology is mature and becoming a commodity. At the same time it is difficult to produce and shortcomings in production occurred on the competitors' side. Hence, backed by several venture capital investors, the company seeks to take 10 % of the autofocus market with its innovative product in a few years. At the time of writing this case study in early 2016, poLight is delivering product samples to major mobile phone manufacturers in order to prepare mass production which is planned to start in 2016.

As regards targeted **countries** of direct customers, poLight follows the business ecosystem of mobile phone and digital camera module manufacturers. This is more and more moving to China but still also strong in Taiwan, Korea and Japan.

How and why poLight internationalised its business activities

poLight interacted internationally right from the beginning. In order to be able to produce and sell large amounts of its product, poLight had to engage with certain types of enterprises in the value

[47] According to poLight website, see http://polight.com/about-us.

[48] See http://www.sintef.no.

[49] See http://polight.com/technology/how-does-it-work.

chain. On selecting partners, poLight looks for the best balance between technological skills, costs and proximity to the main customers. One major co-operation partner is located in Taiwan, a large enterprise doing the final manufacturing steps and the final testing of the product before shipping to customers. It has the capacity to also serve large volumes in the future. poLight carefully selected this company in an identification process with personal visits that took more than half a year. Before engaging with this Taiwanese partner, poLight had approached a US-based multi-national enterprise. Negotiations with this enterprise were discontinued when no satisfactory agreement could be concluded in the targeted period of time.

Another important partner company that develops a certain micro-electro-mechanical piece of the TLens is located in Milan, Italy. Further partners include an expert supporting the design of the test equipment located in South Korea, as well as consultants and suppliers in Japan and China.

Internationalisation of innovation in poLight

Practice

poLight's internationalisation practice beyond Europe is mainly in **partnering** with the enterprises in Taiwan and China as well as with experts in Japan and Korea. poLight received hints to suitable enterprise partners and experts through "the ecosystem", i.e. people in poLight's network of experts and also customers, as the company's Chief Technology Officer (CTO) Pierre Craen states. Next steps may include expanding contacts also to Malaysia, India and Brazil.

Furthermore, poLight has a very **international team**, with employees for example from Norway, Sweden, Korea, China, Belgium, Romania, France, and Russia.

Drivers and barriers

The driving force for linking up with international partners was to find the best ones in terms of performance and costs. poLight found that this can be a tricky issue because cheap does not always turn out to be as efficient as promised. Another driver was to be close to the customers in Asia and to be close to vendors of specific parts of the TLens which are not easily available in Europe.

However, **distance** is a challenge when seeking to create effective and efficient teams but it is hardly possible to sit together regularly. The positive side is that distance allows, alternately, some to work while the others are sleeping. "If you play it well, it is perfect", says Pierre Craen.

There are also **cultural differences** between Europe and Asia which sometimes make it difficult to establish and lead teams. For example, some Asian workers were not found to be used to raise problems and to report them to their superiors, which may however be necessary to identify and solve problems. Mindsets in Japan may tend to be very detailed and from time to time to seek to "control everything", in Pierre Craen's experience. Koreans were sometimes found to be quite pushy. Finally, **language** can also be a barrier. While everyone speaks English, the level of comprehensibility is not always sufficient.

Considering these challenges, poLight might even consider moving some activities in the value chain to Europe sometime in the future. The technology for producing the TLens is highly automated so that labour costs do not play a big role. For the time being, poLight is satisfied with the strong partners the company has.

Support to internationalisation

poLight uses **occasional support from public agencies** for specific purposes. For example, Innovation Norway (http://www.innovasjonnorge.no) provided information for checking what it would take to build a poLight company in China. Innovation Norway also helped to find the right contacts in Asia and specific legal support. poLight found the support from this governmental agency very competent and practice-oriented.

poLight is also looking for benefits in **national and international research projects**. After the initial support from the Norwegian Research Council, poLight took part in a few national and European research projects. While poLight did not yet use outcomes from these projects for its product, such research projects are very important for expanding its network of experts. The advanced concepts from these projects may also be applied in products some day, says Pierre Craen.

Impact and lessons learned of internationalising innovation on poLight

Impact

For poLight it was no question that the company had to internationalise its innovation activities. There is a strong need to be close to the main customers which are located in Asia. There also needs to be the best balance between performance and costs which could not be found in Europe.

Lessons learned

- **Building international networks takes much effort and time**

Establishing international networks of business partners, including developers, testers and consultants, requires strong efforts. One needs to understand the targeted people and their constraints. All in all, however, poLight had to establish such a network mainly in Asia rather than in Europe due to its specific field of business.

- **Possible difficulties with international partners need to be managed**

Engaging with a network of international partners may be challenging due to different mentalities, language barriers, and the simple fact of distance. Targeted service partners may not always keep the promised quality and efficiency when relatively low costs were alluring. SMEs need to anticipate and manage such difficulties.

- **Using international research projects for expanding expert networks**

While innovative SMEs may need to spend most of its resources on manufacturing and marketing, it may nevertheless be worthwhile to participate in international research projects. Such projects may help extend the expert network which is important to find further business partners and employees. The projects may also develop technology for commercialisation in the future.

References

Research for this case study was conducted by Stefan Lilischkis, Senior Consultant at empirica Gesellschaft für Kommunikations- und Technologieforschung mbH, Bonn, Germany, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following.

Interviews

- Pierre Craen, Chief Technology Officer, poLight, phone interview on 16 February 2016

Websites

poLight homepage: http://polight.com, last accessed 11 March 2016.

Innovation Norway homepage: http://www.innovasjonnorge.no, last accessed 11 March 2016.

SINTEF homepage: http://www.sintef.no, last accessed 11 March 2016.

3.2.10 Real Project Partner, France: Developing TV network technology with partners in Japan and South Korea

IN A NUT SHELL	**Real Project Partner (RPP) links television with smart metering. The company offers its services in France but collaborates with TV manufacturers in Asia and participates in international R&D projects. These international activities helped the company enhance its image and its competitive position.**

Abstract

Real Project Partner (RPP) is a small enterprise which specialises in linking home television with innovative smart metering of energy consumption. The company's main customers are social housing providers and local authorities. RPP is based in France and currently only sells to French customers. However, the company collaborates with large TV manufacturers in Asia in order to be able to integrate RPP's smart metering portal in their TV sets. Liaising with engineers from a large enterprise in Japan turned out to be special: There are specialists for any particular issue of product development who work fragmented from each other, requiring long communication processes. Furthermore, RPP needs to be careful about what technical details it discloses in order to prevent the foreign manufacturers from applying the technology in their home markets. RPP found its contacts in the TV manufacturers through their subsidiaries in France. No public agency was involved. In fact, RPP found that national governmental agencies work too slowly for a private business that needs to respond quickly to market developments. The only public support RPP used was taking part in several international R&D projects in EU Framework Programmes. Participation in these projects helped RPP increase reputation as an internationally operating enterprise and a solution finder. Hence RPP's competitive position was also strengthened.

Case study fact sheet

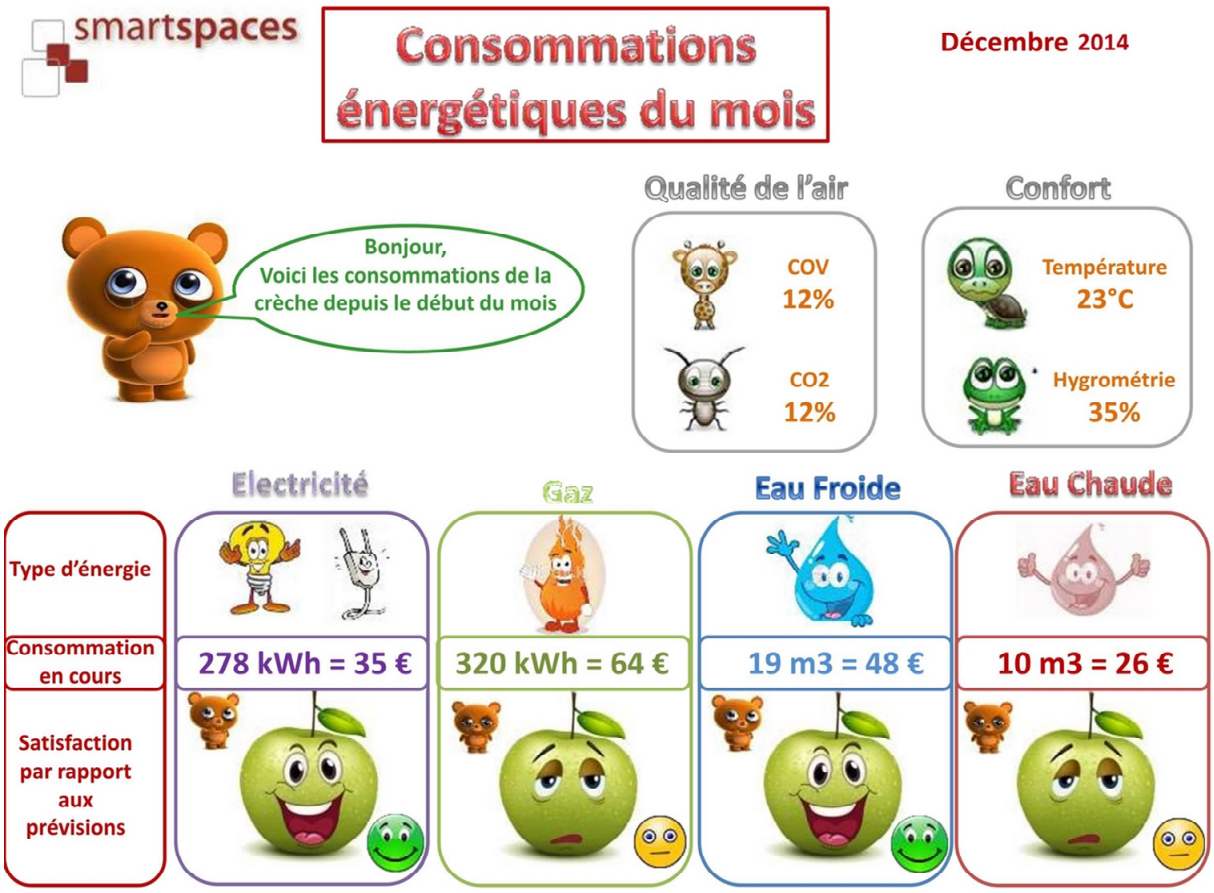
▪ *Full name of company:*	*Real Project Partner SARL, France (http://www.rpp.fr)*
▪ *Year of foundation:*	*2003*
▪ *Number of employees:*	*7*
▪ *Industry sector:*	*Electronics and electrical equipment services*
▪ *Business activity:*	*Information technology networks (optical fibre, power-line communication and Ethernet) deployment and services*
▪ *Activities focused in this case study:*	*Product development with partners in South Korea and Japan*
▪ *Case gatekeeper:*	*Olivier Fabre, Co-Founder and Managing Director*

Background

Business activity and competitive situation

Profile: Real Project Partner (RPP) is a small enterprise in the information technology networks industry, deploying optical fibre, Power-Line Communication (PLC) and Ethernet and providing related services. The company's specialty is linking television with smart metering. Exhibit 1-1 provides an exemplary display. RPP mainly serves the social housing market: It offers user-oriented services such as digital terrestrial television (DTT), satellite and internet television as well as services for social housing companies such as access control, temperature remote control, and a TV channel for controlling energy and water consumption. RPP was founded in 2003, has seven employees and is based in the town of Tavernes in Southern France. The company's three founders used to work in major telecommunications companies before starting RPP.

Exhibit 8-1: Exemplary display of Real Project Partner's smart metering service on a TV set



Source: Real Project Partner / eSESH project

RPP's **clients** include social housing companies and local authorities as well as related service providers in France. RPP's interface to deal with social housing companies is often local or regional councils. RPP plans to expand its services to Germany, Spain and the United Kingdom.

RPP's **competitors** mainly include big French internet service providers. The company's market share is small.

Innovation is crucially important for RPP to remain competitive. RPP seeks offering the best product with no additional cost for the end consumers. Currently, RPP is working with a big international IT services company on large projects related to Hybrid Broadcast Broadband Television (HbbTV). HbbTV is both an industry standard and a promotional initiative. Products and services using the HbbTV standard can operate over different broadcasting technologies such as

terrestrial networks (i.e. antenna reception), satellite, cable, or the internet. RPP's goal is to enable consumers to access their energy consumption data in real-time and also receive alarms by any means available, e.g. smartphones, tablets, and TV sets. The company is also developing a device based on Google Cast technology that will enable a direct link between a TV set and a smart meter.

How and why RPP internationalised its business activities

RPP has profound experience with international business activities outside Europe. RPP started collaborating with large TV manufacturers in Asia in 2010 to arrange the technical preconditions that allow RPP to implement its smart metering portal in their TV sets.

Internationalisation of innovation in RPP

Practice

RPP's innovation activity outside Europe is collaborating with TV manufacturers in Japan and South Korea. RPP discusses technical specifications with them on the phone and through the internet. Collaboration is formalised in non-disclosure agreements. So far the company has not licenced technology from abroad. RPP will continue its international activities based on its business objectives.

Drivers and challenges

RPP's motivation to interact with TV manufacturers in Asia was to **expand business** in the home market – due to the simple fact that Asian firms dominate the French market for TV sets. The reason for selecting specific manufacturers is their large market share. This will allow RPP to implement its products and services in many TV sets in France. RPP found the contacts to the experts in charge through the manufacturers' national subsidiaries in France.

Liaising with engineers from a large enterprise in Japan turned out to be special in terms of **work culture**. There are specialists for any particular issue of product development who, however, work fragmented from each other. "When you need to clarify two related issues at a time, the two specialists in charge won't talk with each other", explains RPP's CEO Olivier Fabre. "Eventually you have to discuss with a higher-level person." This leads to long communication processes. According to Fabre, one has to take such things as they are and understand how the foreign co-operation partners work.

RPP also has to take care that it is an exclusive partner and to not disclose too much of its **intellectual property**. Non-disclosure agreements are important but since RPP and the TV manufacturers do not depend on each other, the manufacturers may still adopt the technology and implement it in their countries without RPP. In order to prevent such occurrences, Fabre's general rule is that "I say what I do but not how I do it".

Support to internationalisation

RPP did as yet not use public support for its business in general and for its international activities in particular. In fact, RPP once considered support from a **national governmental agency** in France for testing a solution. However, RPP found that the agency's processes were too slow and had its own agenda, not sufficiently meeting RPP's needs. Hence RPP terminated the engagement attempt before it actually materialised.

RPP participated in several **European Framework Programme projects** related to smart metering, including above all SmartSpaces (http://www.smartspaces.eu), Saving Energy in Social Housing with ICT (eSESH, http://www.esesh.eu), and Consom'Autrement in Nice. RPP became involved in these projects through large French water suppliers with which RPP already co-operated. These international projects gave RPP the opportunity to test new technology at pilot sites in France and develop the technology further. Further benefits from the projects included that

RPP could expand its contacts to national and international enterprises and learn from experiences in other pilot sites operated by other project partners.

Furthermore, RPP was present at the **EU exhibition stand** at the international computer technology trade fair CeBIT in Hanover in April 2012. Participating at this stand, with the opportunity to meet the Commissioner in charge of the Digital Agenda, happened through the eSESH project. RPP considered the participation very worthwhile, also confirming further opportunities in the European market. Olivier Fabre recommends other SMEs to seize such opportunities if they arise.

Impact and lessons learned of internationalising innovation on RPP

Impact

The biggest impact of its international activities for RPP was on its image: "The customers notice that we participate in international projects and have contacts to Japan", says Olivier Fabre. "We are now perceived as a solution finder, not as a follower." Hence, internationalisation improved RPP's competitive position. RPP sees no disadvantages of its international activities.

Lessons learned

- **International development useful even when selling to a national market**

RPP shows that it may be useful or necessary to collaborate with international partners even when the company only sells to a national market.

- **Adapt to foreign work cultures and protect technology**

Operating internationally requires adapting to the work culture of the target country. One also needs to be prepared for balancing acts – explaining technical approaches to the extent necessary but nevertheless protecting one's intellectual property.

- **Participating in international R&D projects beneficial in several respects**

RPP participated in several European R&D projects. The company benefited through developing its products and services further, establishing new international contacts, and increasing reputation. In this way, such projects may also help expand to international markets.

References

Research for this case study was conducted by Dr. Stefan Lilischkis, Senior Consultant at empirica Gesellschaft für Kommunikations- und Technologieforschung mbH, Bonn, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following:

Interviews

- Olivier Fabre, CEO, Real Project Partner, via internet telephone, 27 November 2015.

Websites

Real Project Partner, http://rpp.fr, last accessed 1/12/2015.

eSESH project, http://www.esesh.eu, last accessed 1/12/2015.

SmartSpaces project, http://www.smartspaces.eu, last accessed 1/12/2015.

3.2.11 Ticketbis, Spain: Fast and widespread international growth in the secondary market for event tickets

IN A NUT SHELL	**Ticketbis, based in Spain, internationalised fast and widespread by introducing an online secondary market for event tickets in Asia and Latin America – without having prior contacts there. A principal challenge for the company's expansion is different legislation across countries.**

Abstract

Ticketbis is an online fan-to-fan exchange for buying and selling tickets to music, sports, theatre and other events. It was founded in Spain in 2009 and to date has grown its network of offices and country-specific websites to 46 countries, employing around 350 staff. The company serves both individual clients as well as companies who seek tickets to sold-out events. Its biggest competitors are located in the US, where secondary markets for tickets are well-established. Ticketbis' main objective has been fast growth through expanding to countries outside the EU, where it faces little or no competition. It internationalised its activities by adapting the innovative business model of an online customer-to-customer ticket market in Asia and Latin America, where it was hardly known. This gave the company the advantage of being the first such exchange there. Notably, Ticketbis had no prior contacts to its target markets. Its main barriers to internationalisation are, beside a need for recurrent rounds of private investment funding, legislative differences in secondary ticketing markets across Europe and other countries. A constantly changing digital landscape requires the company to innovate. A current challenge is to channel its services effectively to a growing number of mobile users. Ticketbis received some public funds from a regional programme and market research assistance from a national public agency. This helped the company expand internationally.

Fact sheet

▪ *Full name of company:*	*Ticketbis S.L., Bilbao, Spain (http://www.ticketbis.com)*
▪ *Year of foundation:*	*2009*
▪ *Number of employees (year):*	*350 (2015)*
▪ *Industry sector:*	*Internet and media*
▪ *Business activity:*	*Online fan-to-fan exchange for buying and selling tickets to music, sports, theatre and other events.*
▪ *Activities focused in this case study:*	*Quick and widespread internationalisation of its activities by adopting a proven innovative business model.*
▪ *Case gatekeeper:*	*Ander Michelena, CEO and co-founder, Ticketbis*

Background

Business activity and competitive situation

Profile: Ticketbis is an online exchange used to buy and sell tickets to sporting and cultural events. Hence it operates as an intermediary in the secondary marketplace for tickets by matching buyers and sellers of tickets, facilitating these transactions. Sellers set the price at which they wish to sell tickets and Ticketbis charges a commission from both parties involved in the exchange. The company was founded in 2009 by former investment bankers and entrepreneurs Ander Michelena

and Jon Uriarte and has its head office in Madrid, Spain. It currently operates in 46 countries, which includes specific websites for different countries as well as local offices.

Ticketbis serves two types of **clients**, individuals and companies. Companies may require multiple tickets to sold-out events as well as special services such as VIP boxes. The company's main **objective** so far has been fast growth through internationalisation in markets outside the EU where it faces little or no competition. It became the first such online exchange in Asia and Latin America. To date, it has around 350 employees who are well-versed in different languages and belong to diverse educational backgrounds.

Ticketbis' largest **competitors** are based in the US, where online secondary marketing for tickets is an established phenomenon. In fact, Ticketbis deliberately adopted a business model that was apparently working well in the US. Knowing where it would potentially face tough competition and where not was an important factor in Ticketbis' internationalisation strategy.

Innovation plays an important role in the online secondary market for tickets. Services offered in this market depend heavily on the internet and on devices used to access the internet. The internet has already disrupted the way traditional secondary markets for tickets behaved. A current challenge is reaching mobile users better. Customers would hardly download and install a mobile application for a ticket he or she buys perhaps once or twice in a year. The company aims to address this problem by developing a disruptive innovation to channel its service to mobile users. Innovation is also necessary when it comes to marketing. To engage more users, Ticketbis builds special websites for important sporting events.

How and why Ticketbis internationalised its business activities

Since its inception, Ticketbis has spread its business to 46 countries around the world. After the first year of its operations in Spain, Ticketbis inaugurated website for six countries in 2011: Italy, Portugal, UK, Brazil, Mexico, and Argentina. In 2012 and 2013 it expanded to further eight countries in South America as well as Germany and Russia. In 2014, Ticketbis began operations in Asia. Exhibit 1-1 shows where Ticketbis has offices (green) and websites (red).

Exhibit 10-3-11: Ticketbis' service coverage over the world

Source: Ticketbis

Internationalisation of innovation in Ticketbis

Practice

Ticketbis pursued a strategy of quick and widespread internationalisation. After initially operating for one and a half years in Spain, it opened offices in Latin America, followed by offices in Asia. It internationalised its services incrementally. In the first step, it aimed for presence in big regional

markets, such as Argentina and Brazil in Latin America and Japan and South Korea in Asia. Initially, it vied for cost-efficient localisation by adapting only to different language requirements, currencies and hiring local couriers for delivering tickets to buyers. There was no strategy yet to localise the product itself and to adapt the business model in any significant way to local conditions. As CEO Ander Michelena explained, "At the moment Ticketbis prioritises only global changes." But its plans for the future innovation of its business activities include a greater level of adaptation to foreign market needs. This could be considered as the second step in its internationalisation process.

Drivers and barriers

Ticketbis had two main **motivations** for selecting the markets it chose to expand to. First, it chose countries which did not have any pre-existing platform for online secondary markets. Second, it chose countries based on the simple premise of having the biggest regional markets, e.g. Japan, Korea, Brazil, and Argentina.

In many countries having no prior online secondary markets for tickets meant that Ticketbis' foremost challenge was to locate buyers and sellers and consequently convince them of the idea of selling tickets online. It was due to this that local presence became absolutely necessary for the company. It internationalised with **no prior contacts** in the target markets and expanded simply by meeting people on the ground, using informal networks to find buyers and sellers (sometimes directly at event venues), and opening offices and hiring employees locally.

The company faced two main barriers to internationalisation. First, in order to make formal partnerships with large event companies it required additional private capital investment. In France for example, formal legislation requires that such contracts be made in order to have the legal right to sell tickets in secondary markets. The second **barrier is legislation** itself. Even in the EU, legislation concerning secondary ticketing markets varies from country to country making it cumbersome to expand. Hence, one of the most significant barriers is that a European Single Market for secondary ticketing does not exist.

Implementing its **marketing strategy** more effectively in different international environments is an additional challenge that Ticketbis needs to address. One particular example is South Korea. Ticketbis' marketing strategy for establishing its presence over the internet relies on search engines. However, in South Korea the dominating search engine is not the same as the one Ticketbis usually applies, and it operates very differently. Hence, adapting better to international markets that differ significantly from one another is one of the main drivers of innovation for Ticketbis.

Support to internationalisation

Ticketbis received some help from public support measures. Initially it received funding from Basque country public policy programmes for SMEs. One of the support systems it deems very useful for its internationalisation was ICEX Conecta, which functions under the Spanish Office for Export and Investment[50]. ICEX Conecta uses its offices abroad to help local Spanish companies internationalise by offering advice and analysis on market conditions and regulations, and provides access to trade fairs and business networks – services that Ticketbis made use of during its internationalisation process.

[50] See http://www.icex.es/conecta.

Impact and lessons learned of internationalising innovation on Ticketbis

Impact

Internationalisation is very important for Ticketbis. 50% of its sales are done in markets outside the EU. It has also helped positively in terms of reputation, especially when attracting investors. Michelena believes that it has been the right strategy to internationalise.

When asked if Ticketbis has faced any particular failures since its inception, Michelena mentions "Eventbis", an event-searching platform they started alongside Ticketbis. Eventbis was consequently shut down after two years of operations because of unsuccessful results and slow growth. Michelena resumes that "it was diverting resources from a more successful business model to an uncertain one".

Lessons learned

- **Early internationalisation can be a successful strategy**

Ticketbis presents an insightful case of internationalisation of innovation activities used by a start-up in the e-commerce industry. First, Ticketbis has proven that internationalisation in the early stages of a start-up can be a successful strategy.

- **Adopting an innovative business model can be a successful approach**

Ticketbis has successfully adopted and implemented an innovative business model in international markets. Ticketbis may serve as an example for other SMEs operating in similar service-oriented markets in the field of e-commerce and Consumer-To-Consumer (C2C) sales.

- **Regulations in other countries may be a barrier even in the EU**

Given the barriers to internationalisation Ticketbis has faced so far, there appears to be a need for a Single Market for secondary tickets in the EU. This may be one example of many specific service markets which have not yet been fully harmonised.

References

Research for this case study was conducted by Jza Abbas Rizvi and Stefan Lilischkis, empirica GmbH, Bonn, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following:

Interviews

- Ander Michelena, CEO and founder, Ticketbis, (Skype, 17th November 2015).

Websites

Ticketbis, homepage: http://www.ticketbis.com/. Last accessed: 23/11/2015.

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Movile, The Growth of the Online Ticket Market: https://movile.com/wethinkmobile/en/growth-online-ticket-market/. Last accessed: 17/11/2015.

Background literature

Europe Economics (2009): Analysis of the Secondary Sales Market for Tickets for Sporting, Cultural and other Events. Final Report. (Available at http://www.europe-economics.com/publications/secondary_sales_market.pdf. Last accessed: 17/11/2015.)

3.2.12 WEPROG, Denmark/Germany: Adapting weather forecast services to specific needs of customers worldwide

IN A NUT SHELL	**WEPROG provides weather forecast services to business clients in the energy industry. The company customises its services for each client, adapting them to weather-related processes. Although there are a number of challenges in markets outside Europe, offering services globally is vital and worth the effort.**

Abstract

WEPROG provides weather forecast services mainly to the renewable energy industry. The company was founded in 2003 and has two locations in Denmark and Germany. The company's clients are predominantly large energy corporations. WEPROG serves markets on a world-wide scale and needs to persistently develop its technology and services further. WEPROG can offer the same services anywhere in the world, tailor-made to the clients' specific requirements and weather-related processes. WEPROG started right off as an international company. Internationalisation is vitally important for WEPROG because the home markets do not offer sufficient business opportunities. The company experiences similar barriers in the home markets and internationally. Some specific difficulties apply to countries outside Europe, related to cultural and regulatory differences. The main barrier everywhere is reluctance to adopt innovations on the part of potential customers. Further barriers include for example skewed competition and unfavourable legislation. WEPROG developed its international links mostly through active participation as speakers in conferences, workshops, research projects, and publications. So far WEPROG did not make use of governmental support measures other than publicly funded R&D projects. All in all, internationalisation of innovation had a significantly positive impact. It helped WEPROG to sustain and develop its business.

Case study fact sheet

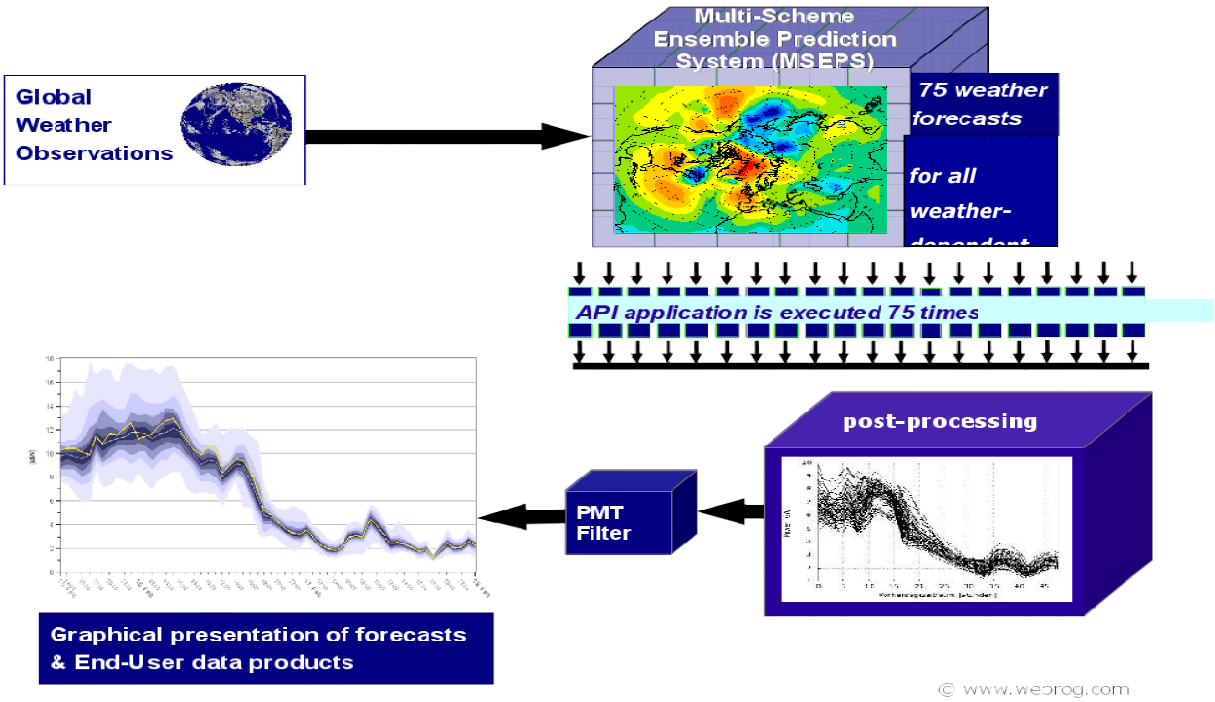
▪ *Name of company and URL:*	*WEPROG ApS, Assens, Denmark / WEPROG GmbH Germany, Altdorf (http://www.weprog.com)*
▪ *Year of foundation:*	*2003*
▪ *Number of employees (year):*	*< 50*
▪ *Budget in most recent financial year:*	*n.a.*
▪ *Industry sector:*	*Business services*
▪ *Business activity:*	*Weather forecast services mainly to energy industry*
▪ *Activities focused in this case study:*	*Customising weather forecast services to customers outside Europe*
▪ *Case gatekeeper:*	*Dr. Corinna Möhrlen, Director WEPROG*

Background

Business activity and competitive situation

Profile: WEPROG provides real-time weather forecast services mainly to the renewable energy industry, in particular wind and solar energy. The company specialises in so-called ensemble forecasting, meaning that it generates a large number of forecasts, 75 in fact. This enables WEPROG to provide probability ranges for all weather parameters, e.g. precipitation, cloud cover, temperature, and wind speed. WEPROG uses the probability ranges to generate specific forecasts for the energy area, such as wind and solar power generation, demand, and market prices. Exhibit 1-1 shows a schematic example of the forecasting processes. The customers' benefit is in optimal trading, managing and operating power units and electricity grids – or, in other words, in avoiding costly and environmentally unfriendly forecast errors. The company is small in terms of employees, was founded in 2003 and is today operating from two locations in Denmark and Germany.

Exhibit 11-1: Scheme of WEPROG's forecasting processes (example for wind power generation)



API = Application Programming Interface, PMT = Probabilistic Multi-Trend.

Source: WEPROG

WEPROG's **clients** are predominantly large energy corporations such as system operators and energy management companies, power traders, developers and operators of renewable assets. The company's main competitors are research institutes, national public weather services, energy forecast providers and resellers. WEPROG operates under high competition. WEPROG targets and serves markets on a world-wide scale. Since its inception, WEPROG has had customers inside and outside Europe, for example in Australia, Africa, Canada, China, Egypt, India, Japan, Taiwan, and the US.

WEPROG's **business objective** is to further the use and application of their advanced ensemble forecasting technique and to assist in the development of a world with sustainable and environmentally friendly industries. In order to broaden its markets and become less dependent from a few big trusts, WEPROG aims at spreading the use of ensemble forecasts into other markets such as shipping, logistics, marketing, sales, and event management.

The most important **market development** affecting WEPROG is related to the company's core technological expertise. Until a few years ago, targeted industries and also research institutes did not recognise ensemble forecasting as a future technology. This has changed dramatically recently, opening up new business opportunities for WEPROG but at the same time also potentially leading to new competitors.

Innovation is vitally important for WEPROG in order to stay competitive. WEPROG needs to persistently develop its forecasting techniques to be able to use newest computing technology as well as improve forecast quality and services offered around its core technology. One could assume that the renewable energy sector, which is attributed paramount importance for the future of European economy and society, is eagerly absorbing innovations. However, WEPROG finds it difficult to market its innovative technology to potential customers. One reason is that integrating WEPROG's weather forecast technology often requires implementing new data management systems as well as new business processes, implying considerable investments. Many large and often inflexible enterprises shy away from such costs. Instead, WEPROG's customers rather require incremental innovations in terms of improving forecasts.

How and why WEPROG internationalised its business activities

WEPROG started right off as an international company because the principal client in the first two years was located outside the home markets. The company built its forecasting system and services in a way that it was able to offer the same services worldwide after only three years of operations. WEPROG runs a technical helpdesk that is available at all times on all days to be able to service customers in all time zones whenever required.

WEPROG builds its services upon computing and network facilities in ISO certified hosting centres that WEPROG has partnered up with, at present two in Germany and one in the US Generating real-time weather forecasts worldwide requires recurring input of weather-related measurements on a global basis. WEPROG uses input data from the National Center for Environmental Prediction (NCEP) in the US.

Internationalisation of innovation in WEPROG

Practice

For WEPROG, each service implementation in a new country is a milestone, because WEPROG learns more about its forecasting system when the company applies it in regions with different climates and geographic characteristics. Hence, while the basic service is always the same, every single service is unique. In other words: WEPROG customises its services for every client, adapting to weather-related processes.

Based on customer requests, WEPROG reviews its services and business strategy every three to six months and modifies them if needed. An example is cloud computing. In the past two to three years, the market became much more dynamic. Contract periods decrease and computing resources need to be more flexible; launching a service with a new customer anywhere in the world requires increased computing resources for a short period of time. WEPROG therefore moved to cloud computing in order to be able to quickly allocate resources for specific tasks.

Drivers and barriers

For WEPROG, internationalisation of its innovative services is very important, because the home markets of Denmark and Germany do not offer sufficient business opportunities. Confining business to the home markets and even to Europe would increase the risk of failure of business proposals and engagements, particularly if customers develop in a direction that WEPROG is not geared to follow or if competition is too high and cheaper products take market shares.

WEPROG experiences similar business barriers in the home markets and internationally, with some specific difficulties outside Europe. The main barrier is widespread **reluctance to adopt innovations** on the part of the customers, as described above. Part of WEPROG's strategy to overcome this reluctance is the recent introduction of a weather forecast application for the public (see http://weather.weprog.com) – entitled "find the weather you like". Through making ensemble forecasts and their benefits widely known, WEPROG intends to create a level of public awareness that will also influence the mindsets of decision makers in potential business clients.

Another barrier, especially since the beginning of the finance crisis in 2008, is unfavourable **governmental policies** of savings that lack holistic and future-oriented views, particularly with regard to developing regenerative energies. WEPROG has also experienced challenges in terms of rules, regulations and policies about power systems and other operation areas.

Furthermore, customers tend to drive **prices** down towards cheap, low-quality services, challenging WEPROG's offers of high-quality services. More generally, prices in a globalised market are not always compatible with local costs, especially for human resources. WEPROG tackles this challenge by strongly automating processes with information technology to reduce manual work done by costly staff. WEPROG also outsources certain processes and shares staff with partner companies.

There are also **cultural barriers**. For example, entering the Asian market has been a challenge for WEPROG because of a different communication culture as well as potentially high costs and risk of failure in case of disputes. As regards the communication culture, especially for tech companies, requests for extremely detailed information about products and services in contract negotiations are problematic. WEPROG often has to take care which information is necessary or dangerous to provide. One should also be prepared for particularly slow communication during contract negotiations and decision making in operative projects as well as for particularly late payment. It is therefore advisable for any SME to take pre-cautions with respect to payments. As regards legal disputes, it may in WEPROG's assessment be much easier and less costly to resolve a dispute within Europe than outside. While WEPROG has so far not had legal disputes, the company calculates them in its offers and in international tenders.

Finally, there is a specific barrier for WEPROG in **developing countries**. According to WEPROG, public research institutions in developing countries receive funds from internationally operating development organisations, thereby out-competing commercial businesses without introducing long-term value to the country. Although funds may be supposed to support SMEs to enter such markets, large development organisations often prefer to fund public research institutions.

Support to internationalisation

WEPROG develops its international links mostly through the directors' active participation as conveners of and speakers in conferences and workshops as well as in research projects and publications. Last but not least, WEPROG's directors also act as advisors for an international non-profit organisation in the field of energy.

WEPROG has experience with **public research and development (R&D) projects** since 2005, for example funded by the Danish Public Service Obligation (PSO) or the German ministries for the environment and the economy. WEPROG's directors also have experience in other Danish and also Irish national R&D projects as well as EU Framework Programme projects. However, most potential partners operate far too inefficiently for a commercial company like WEPROG that is driven by fast market developments. In WEPROG's experience, public research projects are often not managed effectively and too much time is spent on education of partners and reporting to the funding agencies. Considering that project funding allocated to commercial companies is usually 50% (70% under Horizon 2020), it is often cheaper to finance dedicated research internally instead.

So far, WEPROG has not yet participated in other public support measures. One reason is that applications for such support would consume too much time.

Impact of internationalising innovation on WEPROG and lessons learned

Impact

All in all, internationalisation of innovation had a **significantly positive impact**. It helped WEPROG to sustain and develop its business, to be a recognised international player, and to gain experience that improved services in Europe as well.

Like all companies, WEPROG also experienced some unsuccessful tenders and contracts over the past decade. WEPROG attributes this to protectionism (e.g. unspoken rules of having to apply with a partner from the country concerned), skewed competition due to national funding for research organisations, or disadvantageous changes in legislation caused by industry lobbying that made forecasting no longer feasible.

Lessons learned

- **Be prepared for high risk abroad**

Following WEPROG's experience, other SMEs seeking to internationalise their innovation activities need to be aware that there is a high risk abroad. A new market entrant often lacks understanding of the local community, politics, and governmental policies. WEPROG recommends other SMEs to be well prepared for the pitfalls of foreign communication cultures and regulations, particularly in Asian markets.

- **Select your partners carefully**

In case of international joint R&D projects, it is advisable to only engage with partners who comply with the company's business objectives.

- **Difficulties are manageable**

However, in order to run a sustainable business it may be necessary to offer services globally – and after all the difficulties are manageable.

References

Research for this case study was conducted by Stefan Lilischkis, senior consultant at empirica Gesellschaft für Kommunikations- und Technologieforschung mbH, Bonn, on behalf of the study about internationalisation of innovation in SMEs. Sources and references used include desk research plus the following:

Interviews

- Corinna Möhrlen, Director, WEPROG, answers by e-mail on 23 October and 10 November 2015.

Websites

WEPROG: http://weprog.com and http://weather.weprog.com, last accessed 13 November 2015.

3.3 Cross-case findings

3.3.1 Practices of internationalising innovation

Overview about case study findings on internationalisation practices

The case studies provide numerous examples of how SMEs internationalise their innovation practice. The cases represent all five types of internationalising innovation as defined in section 2.1: subsidiaries for innovative purposes, collaboration, customisation, IP acquisition, and hiring labour. They show that within these five types there are many different phenomena.

- **Subsidiaries**: Fruit Freshly has branch offices in Canada and Dubai; Kapro has a production plant in China; KeyGene has a subsidiary in the US, NUMECA has subsidiaries in China, India, Japan, and the US; Ticketbis has sales offices in several countries.
- **Collaboration**: Aisense has strong links with marketing partners in the US and also Japan; Fruit Freshly has distribution partners in several countries; NUMECA liaises very closely with research institutes in its field of technology; poLight has production partners in East Asia; Real Project Partner collaborates with big manufacturers for implementing its technology in TV sets; WEPROG procures weather-related data from international suppliers.
- **Customisation**: KeyGene, LifeTec and WEPROG customise their services for each individual client; Fruit Freshly customises a share of its products and services.
- **Labour**: Fruit Freshly's founder is a native Indian; Acreo, KeyGene and poLight have a larger share of employees from outside Europe; NUMECA hires engineers from foreign countries because the number of suitably trained candidates is small world-wide.
- **IP acquisition**: NUMECA occasionally acquires intellectual property from international research institutes. Formal acquisition of IP was found to be a rather rare phenomenon in the selected SMEs.

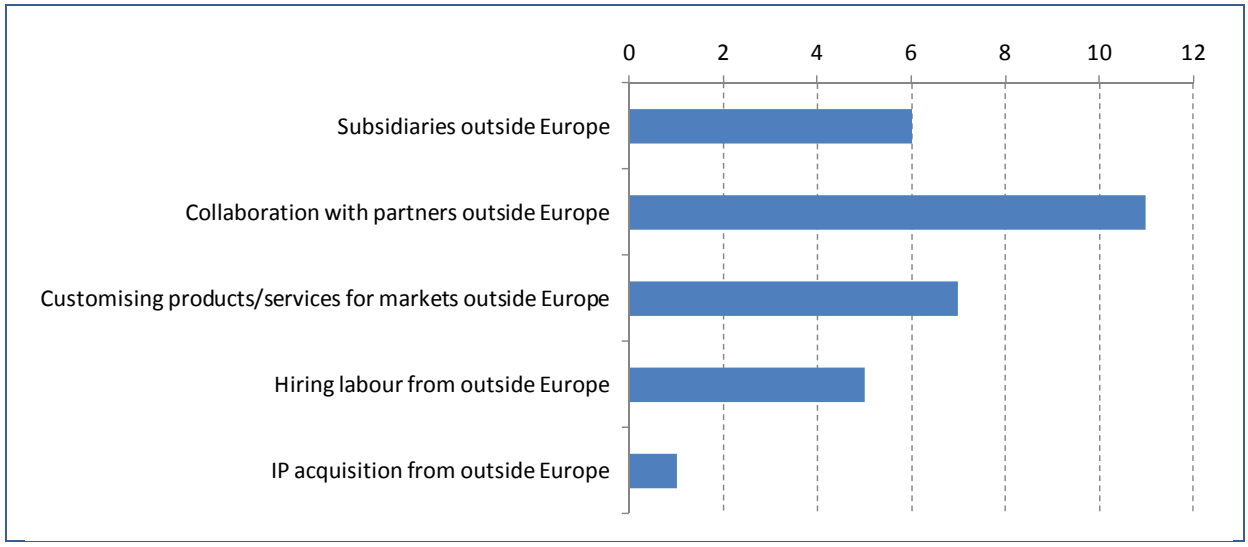
The cases also show that there are many different combinations of the types and no dominant scheme. Each SME performs the types that are most suitable to its profile, business objectives, customer requirements, and competitive situation. Exhibit 3-12 gives an overview about which of the cases practices what type. Exhibit 3-13 shows the frequencies of the five types of internationalising innovation among the case SMEs.

Exhibit 3-12: Case SMEs' practices of internationalising innovation beyond Europe

Practice \ Case	Acreo	Aisense	Intermet	Kapro	KeyGene	LifeTec	NUMECA	poLight	RPP	Fruit Freshly	Ticketbis	WEPROG
Subsidiaries outside Europe	-	-	-	++	+	-	+	+	-	++	++	-
Collaboration with partners outside Europe	++	++	++	+	+	+	++	++	++	+	-	+
Customisation for customers outside Europe	-	-	++	+	++	++	-	-	-	+	+	++
IP acquisition from outside Europe	-	-	-	-	-	-	+	-	-	-	-	-
Hiring labour from outside Europe	++	-	-	-	++	-	++	+	-	+	-	-

++ = strong/important; + = weak/not so important; - = non-existent

Exhibit 3-13: Frequency of internationalisation types in the case SMEs



Source: empirica, twelve case studies in 2015/2016

Expert statements on internationalisation practices

In general, the experts interviewed for this study agreed that there is a **trend for innovative SMEs to go international**. This does not only apply to marketing and sales but also to supply chains and R&D. Two experts said that European SMEs should internationalise their innovation activities even more. Internationalisation may be a necessity because if an SME does not globalise its activities, competitors will. One expert suggested that the further up on the high-tech ladder a company is, the more international its network needs to be. The reason is the necessity to find the absolutely best partners to deal with, wherever in the world. However, some SMEs will need to strengthen their local and national base as well.

Another expert said that research shows that **internationalisation and innovation are linked** in both directions: The more international an SME operates, the more innovative it becomes. This is because being exposed to international markets and customers fosters innovation. On the other hand, SMEs with innovative products tend to be more international. This expert also said that there is a trend for young companies to have a higher interest in formal R&D collaboration, but rather on a local level with regular personal contacts.

As regards the **ways of internationalising business**, the experts differed somewhat in their assessments. This may reflect their different perspectives due to their professional background and to some extent possibly also their country of origin. One of the experts interviewed for this study said that establishing **subsidiaries** in foreign countries and even **partnering** is becoming less important. Another expert saw basically two groups of companies with regard to subsidiaries and partnering: First, those selling electronically distributed products or services which can also build a local presence electronically. Second, those which need a physical partner for selling their products. There may be a sub-group that may first need to deal with one larger customer and then found subsidiaries if possible and needed.

One of the experts stated that **customisation** of products and services is overall not a prominent way of international innovation activities, particularly not in ICT. For example, in cloud-based solutions, providers only sell an English version – that's it. In contrast, another expert saw customisation of products as the most frequent way of internationalising innovation in SMEs. However, there is a considerable share of companies that does not customise by country but by target group. While the cultures in different countries may be different, the culture within the specific niche group to which the product is sold may be the same. In any case, both experts stated that what is really required is people who know how the target market works. This applies

mainly to Eastern cultures like China, not so much to the US. One of the experts said that the type of internationalisation very much depends on the industry. For example, customisation is important for some industries like machinery but less important or even impossible for others like food and beverages.

The experts did not highlight the acquisition of IP or hiring labour from foreign countries.

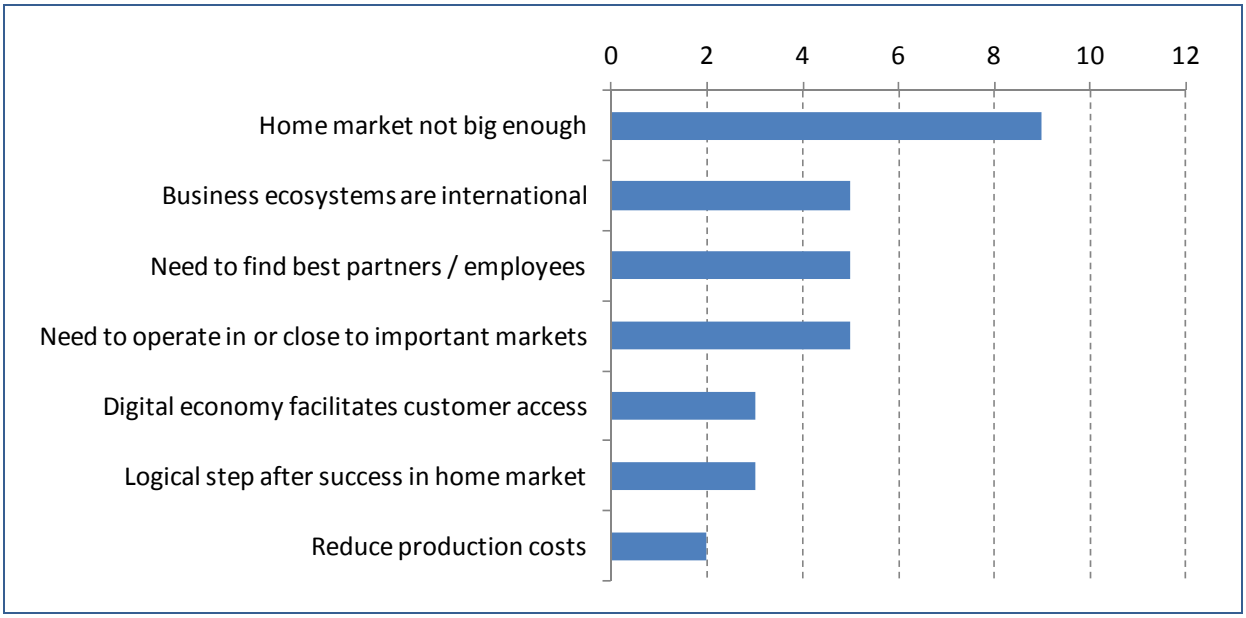
As regards **target countries**, one expert said that SMEs in business-to-business markets tend to select customers' location, not specific countries. On the other hand, SMEs in business-to-consumer markets rather tend to be oriented towards selected countries.

3.3.2 Drivers and barriers of internationalising innovation

Drivers and motivations

The case studies revealed several drivers for triggering innovative activities outside the home country, and the cases show different drivers for engaging in specific types of going international. Exhibit 3-14 indicates the frequency of certain drivers to operate internationally among the case SMEs.

Exhibit 3-14: Frequency of drivers to operate internationally in the case SMEs



Source: empirica, twelve case studies in 2015/2016

As regards drivers to go international at all, the case studies show that reaching a **sufficient number of customers or more customers** is most important. The expert interviews confirmed this finding. Most SMEs offer highly specialised products or services for which the national or European market would be too small to run a sustainable business, or which require international resources. Vice versa, if a technology is globally used and the market is not restrained by local conditions, an SME may have to go international in order to remain competitive. Accordingly, one expert said that "for many SMEs, internationalisation is a must, not a will". Considering that internationalisation often requires customising products and services, which implies innovation, the case studies confirm the notion that SMEs' innovation and internationalisation activities are often interdependent. In an online survey of experts conducted for this study, the majority confirmed the

statements that "The more international an SME operates, the more innovative it becomes" and "The more innovative an SME is, the more it benefits from going international".[51]

Beyond reaching more customers, **business ecosystems** tend to become more international. The fact that important collaboration partners are located in foreign countries is also a reason for SMEs to operate internationally. This may apply to manufacturers in Asia which need to implement the SME's product (poLight, Real Project Partner) and to research partners (Acreo, KeyGene, Numeca).

Going international may also be a logical next step after being successful in the home market. This step may be induced rather accidentally as in one case: Potential customers outside Europe may identify a certain SME through the internet and approach it (Fruit Freshly). The driver in this case is increased market transparency in the **digital economy**. The internet may also facilitate sales of digitised products in foreign countries, even without being physically present there (Ticketbis). The internet also offers opportunities to do research about foreign markets, e.g. customers' preferences and competitors strengths and weaknesses, which may be a driver to go international (no case example).

However, many innovative SMEs find it **necessary to operate in (or close to) important markets** through subsidiaries, collaboration partners or hired labour from these countries. Even if the digital economy facilitates business without presence, many innovative SMEs cannot do without such presence in one or another way. This even applies to the Ticketbis Company in some of its targeted countries. This leads to the issue of drivers for the specific types to internationalise innovation (see section 2.1):

- Drivers to establish **subsidiaries** in foreign countries: Ability to serve a core market better (Kapro in the US; Fruit Freshly in Canada). Benefiting from a foreign country's considerable R&D investment in the company's core business (KeyGene in the US). Developing markets in promising countries (Fruit Freshly in Dubai, NUMECA in China, India, Japan, US). Reducing production costs (Kapro). Notably, in an online survey of experts carried out in the framework of this study, the majority of experts disagreed with the proposed statement that "In the digital economy, establishing subsidiaries in foreign countries and even partnering is becoming less important".[52]
- Drivers to **collaborate** with partners in foreign countries: Co-operating with companies that can distribute the products swiftly to customers in foreign countries (Fruit Freshly). Building a value chain of suppliers that offer the best value for money and are geographically close to the customers (poLight). A need to source ever new technological knowledge in the SME's field of business from any relevant research organisation in the world in order to stay competitive (NUMECA). Same for WEPROG with regard to input from international weather data suppliers. Real Project Partner collaborates with large TV manufacturers in Asia in order to allow implementing its technology in most frequently used TV sets.
- Drivers to **customise** products or services for foreign markets: Reach more customers (LifeTec); influence the market, i.e. the type of products and services offered (LifeTec); necessity to adapt to local weather-related processes (WEPROG).
- Drivers to employ **labour** from foreign countries: Seeking to build a team with the best experts available (Acreo, KeyGene). Using the opportunity to employ an expert who has the right mother tongue to serve a particular country or continent (Fruit Freshly). Need to source labour globally because there are only a few suitably trained candidates (NUMECA).

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[51] See Selhofer (2016), items 8c and 8d. See also the statements about "main drivers" of going international in item 10, which confirm the findings from the case studies for this report.

[52] See Selhofer (2016), item 8e.

- Driver to acquire **intellectual property** from foreign countries: Need to remain at the forefront of technological development in its field of business (NUMECA).

More generally,

Barriers and challenges

Three general issues can be noted about the barriers and challenges which the case SMEs face in their international business, related to number, importance, and specificity: First, the SMEs elaborated on **numerous different barriers**. Second, by and large such challenges were found to be **well manageable**. Figuratively speaking, the challenges may be squeaky wheels but they do not block the pivot. An expert survey conducted in the framework of this study confirms this assessment.[53] Third, the challenges can be **quite specific** to the companies' particular business activity. The challenges can be subdivided into four groups: cultural, geographical, governmental, and business-related. Specifically, the case studies revealed the following challenges.

Challenges related to **culture** and language:

- Cultural differences, i.e. different values, mentalities and communication styles (Fruit Freshly, Intermet, Kapro, LifeTec, poLight, Real Project Partner, WEPROG).
- Language barriers (Food Freshly, poLight).
- Lacking respect of intellectual property in certain countries (KeyGene).

Distance is a challenge in the nature of things when doing business with countries outside Europe:

- Distance to customers (Kapro, LifeTec) and to partners in the value chain (poLight) which makes it difficult to meet, talk and lead personally.

Challenges related to **governmental** policies:

- Regulation – different regulations (Ticketbis: regulation for secondary ticket markets; WEPROG: power industry regulations) or slow decision making processes (KeyGene).
- Protectionism – directly in terms of countries seeking to protect a specific industry (KeyGene) or indirectly in terms of implicitly requiring to take a national partner on board in internationally tendered research projects (WEPROG).
- Customs issues prolonging product delivery (Fruit Freshly).
- Unfavourable governmental savings policies lacking a holistic, future-oriented view on regenerative energy (WEPROG).

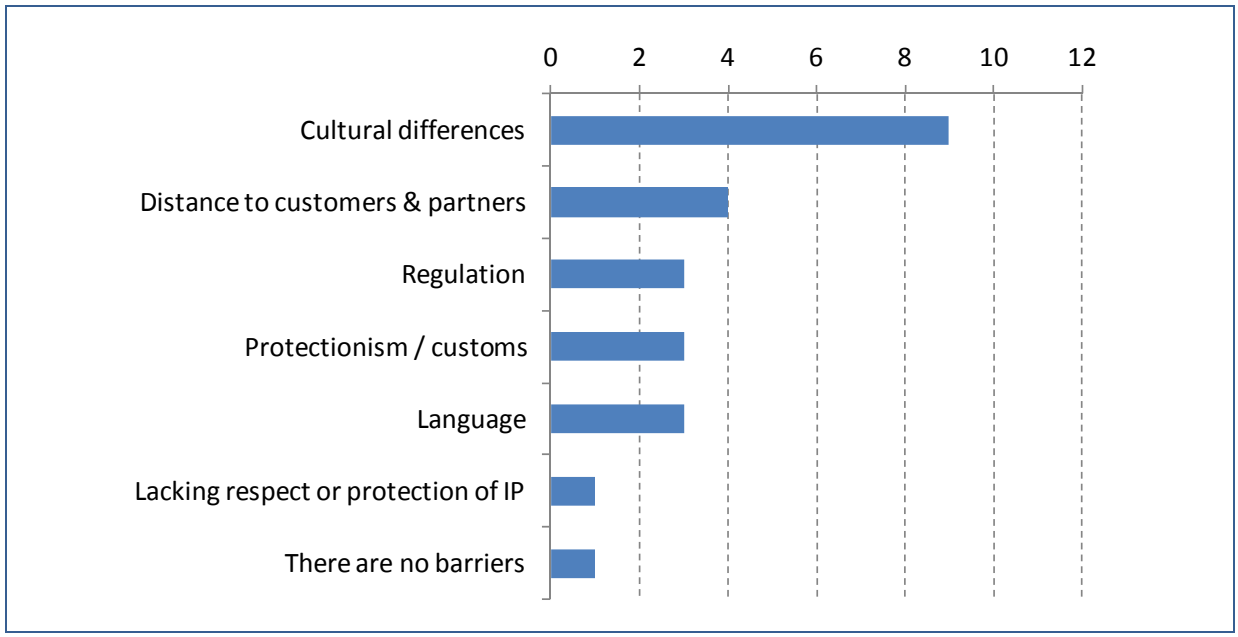
Business-related challenges, which may to a large extent be due to the SMEs' small size:

- In developing countries: Large development organisations preferring to fund local research institutes instead of foreign SMEs (WEPROG).
- Reluctance to adopt innovations on the part of potential big customers (WEPROG), which is however not necessarily an issue only in foreign countries.
- A need to be very careful about what details of the SME's technology one should tell collaboration partners in order to protect one's intellectual property (KeyGene, Real Project Partner, WEPROG).

[53] See Selhofer (2016), item 8b.

One company (NUMECA) stated that there are no barriers – which may be a special case because the company sells a standardised product with no customisation needed. Exhibit 3-15 shows the frequencies of certain barriers among the case SMEs. The online survey of experts conducted for this study by and large confirmed these barriers, while emphasising more strongly the importance of legal barriers.[54]

Exhibit 3-15: Frequency of barriers to operate internationally in the case SMEs



Source: empirica, twelve case studies in 2015/2016

Cultural differences appear to be the most challenging aspect of international activities in the case SMEs. As collaborations become more complex as well and larger and long-lasting, they are more influenced by cultural rules, norms, and expectations. The cultural dimension makes international collaboration more difficult (Nolan, 2011) than national collaboration. Multiple intersecting and often internally contradictory cultures make it difficult to create and sustain good partnerships. They render true collaborative work difficult. In the end, collaboration occurs between people and not between institutions. However, one of the cases contested the assessment that cultural differences would be most challenging: Aisense made very positive experiences with dealing with partners from the US and Japan, while dealing with potential partners in Europe was found to be rather difficult. At the expert workshop carried out for validating findings for this study, a representative from Slovenia seconded this experience; for many Slovenian firms it would be easier to find business partners outside Europe than in Western Europe.

The case studies suggest that **language** may be a problem because even if everyone speaks English, comprehensibility is not always the case (poLight) or communication requires a level of detail that can only be achieved in the mother tongue (Fruit Freshly).

The experts interviewed for this study differed somewhat in their assessments of the **principal barriers**. One said that language, culture and mindsets are the most important barriers to internationalisation. In contrast, another expert said that language and culture may be barriers, but trivial ones. This expert further relativised the importance of language, saying that everyone speaks English. Instead, for an SME's success, market understanding is important, not the target

[54] See Selhofer (2016), item 12.

country. As regards culture, in this expert's three years of intensely dealing with Japan, the biggest challenge was with partners in a neighbouring country in Europe with whom this expert also dealt.

Another expert stated that the development of **distribution channels** is the major barrier.

One of the experts also stressed the need to protect **intellectual property** – otherwise big collaboration partners may become big competitors.

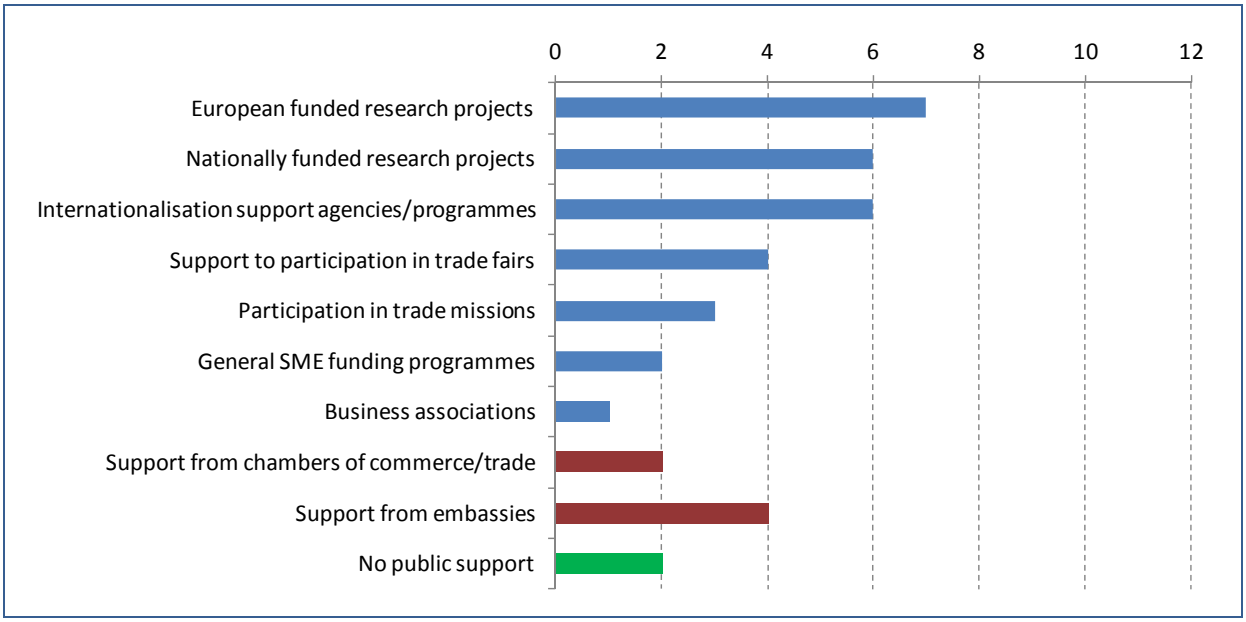
One of the experts said that the most important barriers to internationalisation are **time and money**. Time is needed to enter a market, and innovative companies need to enter their markets as early as possible. Entering a market may be possible in some countries but not in others because competition would be too strong. This expert was in favour of quick try and quick fail approaches for entering markets. Money is needed to make market entrance happen quicker.

3.3.3 Public support measures for internationalising innovation

An overview about support measures used by the case SMEs

The case SMEs used a variety of public support measures for internationalising their innovation activities. Some of these measures are in the field of both internationalisation and innovation, some support only innovation and others internationalisation, and some measures are for general business support. Exhibit 3-14 provides an overview about numbers of case SMEs receiving support through specific programmes or organisations. This includes chambers of commerce and chambers of trade as well as national embassies which are permanent public organisations (embassies) or semi-public organisations (chambers of commerce and trade). They offer continuous support rather than support activities with a limited time horizon like the other measures.

Exhibit 3-16: Frequency of measures supporting international innovation activities used by the case SMEs



Source: empirica, twelve case studies in 2015/2016

Public support measures in the field of both internationalisation and innovation:

- European (co-)funded research projects (including EU Framework Programmes for research): Acreo, Intermet, KeyGene, LifeTec, NUMECA, poLight, Real Project Partner.

- Nationally funded research programmes with international participants: Acreo, LifeTec, poLight, WEPROG.

Public support measures in the field of innovation but not internationalisation:

- National research projects (with national participants only): Intermet, Kapro, LifeTec, WEPROG.

Public support measures in the field of internationalisation but not necessarily innovation:

- National organisations supporting internationalisation: Acreo, Intermet, Kapro, LifeTec, Ticketbis.
- Support to participating in international fairs and exhibitions: Acreo, Kapro, Real Project Partner, Ticketbis.
- Trade missions to foreign countries: Intermet, KeyGene, LifeTec.
- Support from embassies: Intermet, Kapro, KeyGene. Also Acreo because Business Sweden in Japan, with which Acreo co-operates, is located at the Swedish embassy in that country.
- Support from chambers of commerce and chambers of trade: Fruit Freshly, Intermet.

General SME support measures which do not necessarily require innovation or internationalisation:

- National or regional SME funding programmes: NUMECA, Ticketbis.

One of the case SMEs (Fruit Freshly) stated that it did not yet use any public support; only consultancy from the chamber of commerce and the chamber of foreign trade.

An assessment of specific support measures

Quite prominently mentioned was participation in projects of the European Commission's **Framework Programmes** for research, development and innovation, which was also due to a selection of enterprises identified through these programmes. The SMEs which took part in Framework Programme projects found them very useful. This positive assessment was not only thanks to the research insights gained but also to the international contacts which were established and deepened.

One company (WEPROG) also participated in **national research projects** funded by various European governments. While these projects are funded by a national government, the project itself may well comprise international partners. However, WEPROG meanwhile reduced its participation in such research projects because it found that too much time needs to be spent on administrative issues and partners often do not meet the requirements of an enterprise operating under high competition.

Several companies reported that **national organisations** helped them going international: Four companies used chambers of commerce or chambers of trade. Three companies said they benefit from their national embassies in foreign countries. One of the experts recommended embassies as a good entry point. Ticketbis received help from a national internationalisation support agency to analyse foreign markets.

Two SMEs reported support to attend international trade **exhibitions and fairs** (Kapro, Real Project Partner) but did not elaborate on this.

One company (LifeTec) participated in **international trade missions** organised by its national government and found it very helpful. The experts tended to be reserved about trade missions. One of the experts stated that trade missions are generally a valid method. However, since such missions are small, they cannot cover a considerable number of SMEs. Furthermore, there are too many delegations organised by rather small entities such as cities but as yet no pan-European

trade missions for SMEs organised by the European Commission. Another expert said that many innovative SMEs find trade missions not useful for the niche markets they serve.

Several companies made use of **general SME support programmes**, regional or national, such as start-up funding for growth.

One of the experts interviewed for this study said that the **public-private-partnership** model needs to be strengthened for supporting innovative SMEs in going international. Public authorities and private businesses need to fund "ecosystem builders" and "connectors" who link innovative SMEs with other market actors such as investors, legal firms, and consultants who know how international markets work. Such support would be most important on the pan-European level.

Another expert pointed to a lack of organisations supporting SMEs' internationalisation in **particular European countries**. Research showed that a number of SME support measures are hardly used. It remained unclear whether these organisations did not meet SMEs' needs or whether the SMEs just did not know about the support measures because the measures were not well marketed. Innovative firms often call for specific support, e.g. for particular industries.

A further expert pointed to the usefulness of active **mentor networks**. Many SMEs have no problems finding funding but they do find it difficult to convince potential customers to buy their products. This is where mentors could help – mentors based in the home country and in target countries. However, some mentoring programmes do not work well, for example because they engage in the process too much. SMEs should be allowed to choose the contacts they want to work with.

All in all, one expert found that a **redesign of public support measures** for international activities of innovative SMEs would be necessary. Redesigned measures should also consider the specific needs of "born globals", many of which complain that there is not sufficient attention for them. There are either measures for exporting or for start-ups but not for both. Another expert pointed to the success of a turnaround approach for fostering young firms: Instead of funding huge R&D projects with inventions which would rarely find customers, it would be more successful to push the SMEs to encountering and listening to potential customers very early on. This expert also summarised that public sector support should be flexible, simple and quick. This expert was in favour of quick try and quick fail not only in SMEs' market access attempts but also in governmental policy approaches. In Europe one would often analyse much and lose time; one should act more intuitively. Furthermore, the impression of this expert is that European countries often work against each other, while the real competitors are in the US and Asia. Europe should be considered as one market, so that the companies are more nimble and flexible.

3.3.4 Impacts and lessons learned of internationalised innovation activities

Impacts of internationalising innovation activities

All case SMEs report **positive impacts** of internationalising their innovation activities. Internationalisation helped sustain and expand their business. For the innovative SMEs examined here, internationalisation is a necessity. Hence, the case studies support that there is a causal relationship between innovation and internationalisation as suggested in some literature, and they support the assumption that sustainable internationalisation goes beyond exports and is driven by innovation.[55]

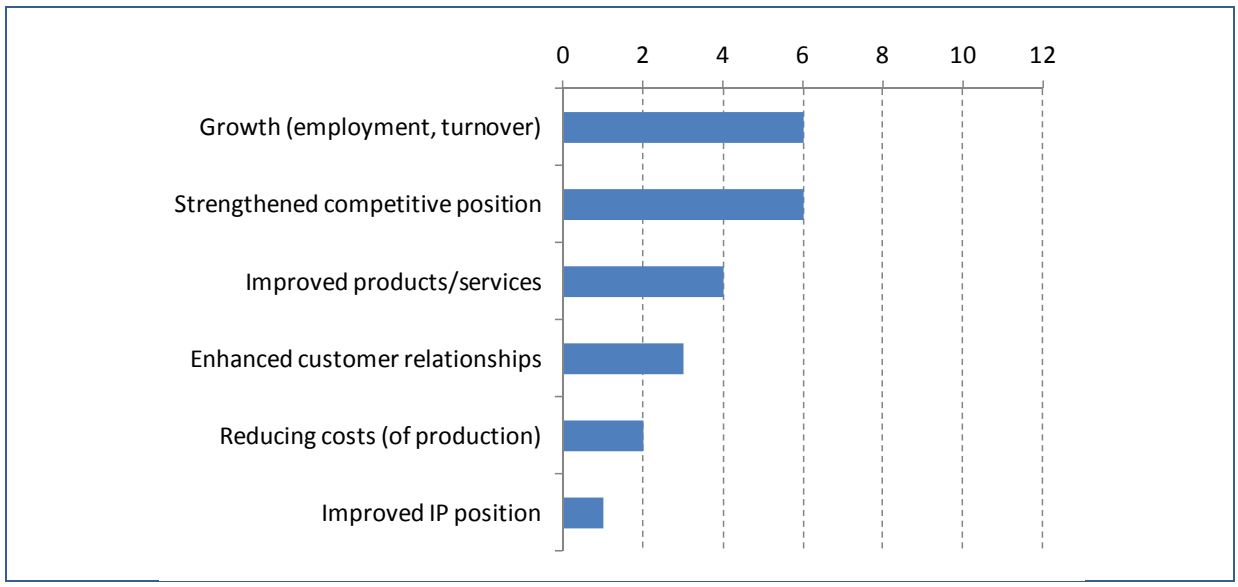
Specifically, the case studies found the following impacts:

[55] See Altomonte et al. (2013) and section 2.2.

- **Growth**: Contribution to the company's growth in terms of employment and turnover (Fruit Freshly, Intermet, KeyGene, LifeTec) or at least growth of certain departments (Acreo).
- **Competitiveness**: Reaching or retaining a strong competitive position (LifeTec: standard-setting level; NUMECA: cutting-edge position in technological competence); increased reputation in the market (Real Project Partner, Ticketbis); becoming a recognised player in the market (WEPROG).
- **Quality**: Gaining experience for improving quality of products and services (Fruit Freshly, Intermet) or for further developing and improving services (WEPROG).
- Enhanced **customer** relationships (Aisense, LifeTec, poLight).
- Reduced production **costs** by having innovative products manufactured in a lower-wage foreign country (Kapro, poLight).

The interviews with experts confirmed that internationalisation normally has a relevant or even high positive impact on SMEs. For "born globals" like Acreo and poLight it was indispensible to operate internationally so that the companies find it hard to mention an "impact" of this practice. Exhibit 3-17 provides an overview of the frequency of certain impacts mentioned by the case SMEs.

Exhibit 3-17: Impacts of international innovation activities on the case SMEs



Source: empirica, twelve case studies in 2015/2016

Disadvantages and failures of internationalising innovation activities

While probably all cases experienced disadvantages and failures in their international innovative business activity, few cases reported about them. WEPROG attributes unsuccessful tenders and contracts also to protectionism, skewed competition, or disadvantageous changes in legislation. This may reflect typical difficulties of rather small enterprises.

One of the experts interviewed for this study said that many SMEs report that internationalisation implies a **dispersion of resources**. There may be a trade-off between domestic and international market presence because SMEs may be too small to spend adequate resources on both.

There are also reports that **distributors** in foreign countries can be difficult to manage, that there are different expectations and also inappropriate behaviour on the part of the distributor.

Lessons learned from internationalising innovation activities

The cases may also show specific **lessons** other SMEs could learn from their experience. These lessons are broad and reflect the SMEs' different business activities, business models, and types of internationalisation.

- SMEs which have not yet participated in **European research projects** should consider their benefits (LifeTec).
- SMEs should actively seek participation in international **trade missions** (LifeTec). This lesson may apply specifically to high-tech SMEs, and the type and destination of the mission may be decisive.
- SMEs seeking international contacts should actively search relevant **public agencies** which have such contacts (LifeTec).
- SMEs needing to source new **technological knowledge** from abroad do not necessarily need to charge foreign institutes with R&D tasks or even establish subsidiaries for R&D purposes; creating informal links and occasionally purchasing intellectual property may be sufficient (NUMECA). This is because Numeca piggybacks on the international research network of the Free University of Brussels. Other university spin-offs may show the same or a similar pattern.
- Offering services internationally may be **risky and challenging** so that SMEs should be prepared for foreign communication cultures and regulations, particularly in Asian markets. However, challenges are manageable (WEPROG).
- Benefits for the **manufacturing process** in a subsidiary in a foreign country through having some R&D also done in that subsidiary (KAPRO). This may apply specifically to the manufacturing of physical products. For virtual projects, i.e. software products, there may be much less need to establish production plants in other countries.

Types of SMEs by motivation to go international

The case studies can be used to develop a graphical display with a typology of European innovating SMEs that have internationalised and their motives to do so. The case studies comprise the following types of innovative SMEs in terms of motives for international activity. The boundaries between these types may be blurred. Starting from the established term of "born globals", the labels for the other types adopt the notion of "global":

- Born globals: poLight, Numeca, Ticketbis, Weprog.
- Urged globals: Acreo, Aisense, Kapro.
- Intentional globals: KeyGene, Intermet, Real Project Partner.
- Accidental globals: Fruit Freshly, LifeTec.

These types represent a diminishing necessity to go international.

For "**born globals**", going international right from the start is indispensable. This may have different reasons: the main customers (poLight, Weprog) or main research co-operation partners (Numeca) are located in foreign countries, or the company has an international strategy from the start (Ticketbis).

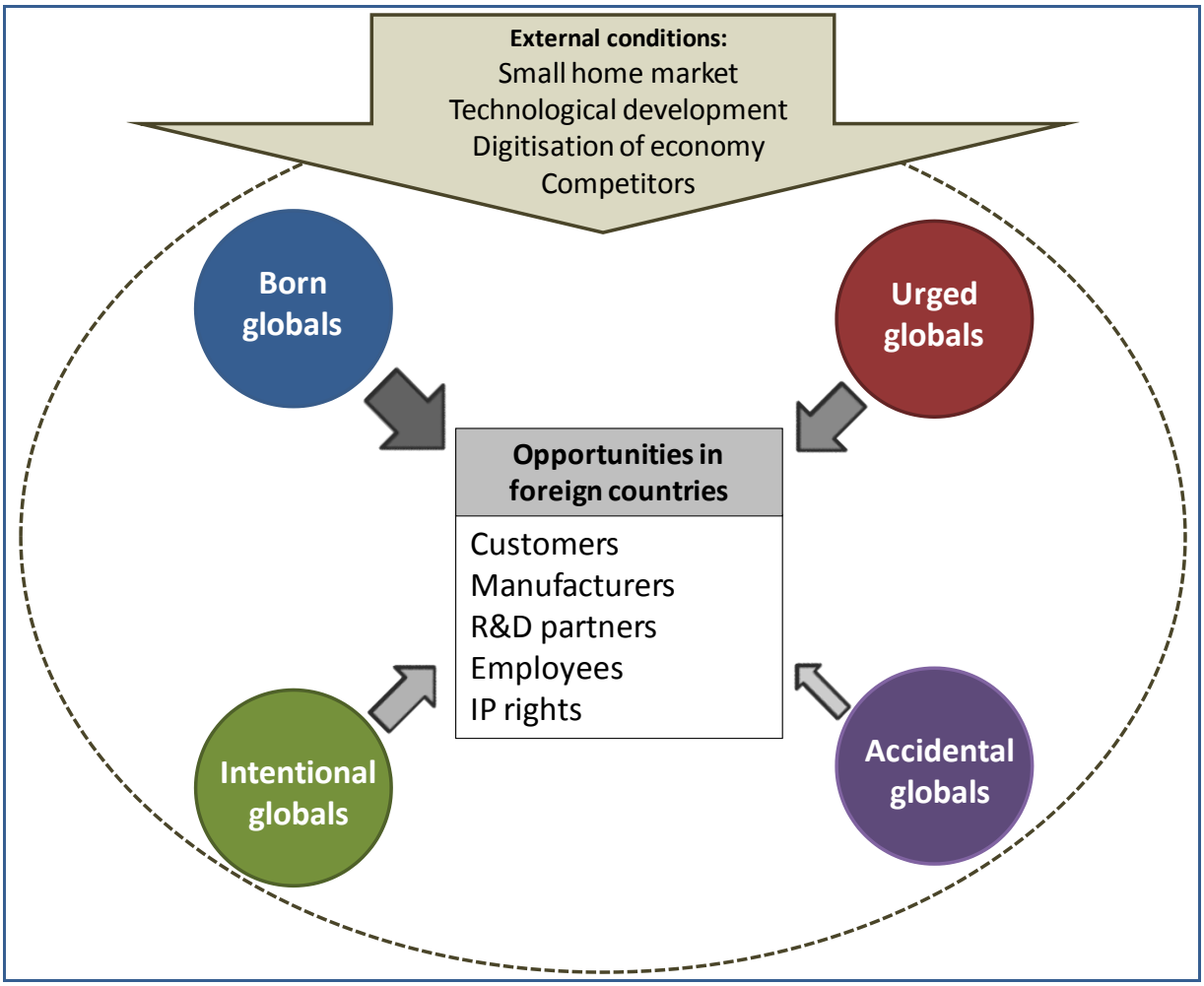
"**Urged globals**" may not have intended to go international from the start but it turned out to be a necessity in the course of developing business. This may be because technological developments that are at the core of the SME's business become international (Acreo) or because potential customers in Europe are too reserved while customers in foreign countries are quite open (Aisense). It may also be that the home market is too small to grow the company further or that cost pressure increases so that going international for sales and production is a logical step at some point (Kapro). Being "urged" does not necessarily imply to consider international activity as a burden – at least it is no burden for the cases in this study.

"**Intentional globals**" actively seek opportunities in foreign countries. They clearly see the benefits of becoming active in foreign countries at some point of time in business development. It may be, as in KeyGene, that a new CEO comes in and gives the company a dedicated international direction in order to become more innovative and grow the company. It may also be, as in the case of Intermet, that the company develops certain products further in a way that target customers are rather located in foreign countries (like protection against pirate attacks). Another reason may be that large manufacturers that need to implement one of the SME's products are located in foreign countries so that co-operation with them is necessary (Real Project Partner).

"**Accidental globals**" go global by chance. They did not intend to go international but passively find and seize opportunities to do so – for example because potential customers identify and approach the SME (Fruit Freshly, LifeTec).

Exhibit 3-19 shows the external pressures and the opportunities in foreign countries which these types of innovative SMEs may seek. Notably, competitors were rarely explicitly mentioned as a driver to go international. Competition was apparently taken for granted.

Exhibit 3-18: Motives for types of innovative SMEs to internationalise



Source: empirica

4 SWOT ANALYSIS OF RELEVANT SUPPORT MEASURES AND INFRASTRUCTURE

This chapter describes the results of a SWOT analysis (strengths, weaknesses, opportunities and weaknesses) of EU policy measures that are in support of the internationalisation of SMEs' R&D and innovation activities. First, we shortly describe the types of internationalisation distinguished and the methods used for the SWOT analysis. Next, we provide an overview of the portfolio of EU support measures and infrastructure that are currently in place. Based upon existing review studies and the case studies in Chapter 3, we assessed the strengths and weaknesses of this portfolio of EU instruments as well as possible opportunities and threats.

4.1 Framework to categorise policy support measures

In section 2.1 a classification of internationalisation of innovation activities has already been introduced. This classification refers to the ways *how* activities can be internationalised: by establishing subsidiaries abroad (branch type), by international collaboration, by accessing foreign markets with tailor-made projects or services (customising type), by purchasing foreign IP or by hiring staff from other countries (employment type).

However policy measures often do not directly refer to these innovation activities but rather to the processes within a firm. Such business processes refer to *what* activities are being done by a firm: sales, production, and research and innovation.

All firms sell products or services. This is the reason of the existence of a firm. However not all firms produce these products or services themselves. They might be acquired from other firms. Likewise, firms that produce goods do not necessarily have to innovate. Finally, firms that do innovate – in the classical Schumpeterian definition of commercializing an invention[56] – do not have to be involved in the research and development that leads to the original discovery or invention.

A firm can decide to be involved in sales, production and research and innovation at home or abroad. If a firm (partly) internationalises one or more of its business processes, the earlier mentioned classification of internationalisation can be applied. For instance, it can adapt a product that it sells abroad to the specific local needs of the foreign market (customization), it can set up a production plant abroad, base its innovations on foreign IP or collaborate with a foreign university.

While specifying the various types of activities, we should be wary about the specific scope of this study: not every international activity involves innovation, and not every innovation activity is international.

I. **Export (sales).** One of the most common international activities among SMEs is selling products abroad. This can either involve the (re)sales of goods that are acquired from other firms or the sales of goods that are produced by the firm itself. All five types of internationalisation activities apply. Export and trade can be done via local subsidiaries, or in collaboration with local (sales) agents. The distinction between branching and collaboration is blurry, especially of these agents are on the payroll from the firm (employment). IP purchase for this specific business process involves the acquisition of local brands. These activities do not necessarily involve innovation.[57] This means that support measures that merely support export and trade are not much relevant to innovation. The only exception is customisation.

[56] J.A. Schumpeter (1939), p.80.

[57] Although the introduction of an existing product in a new market can also be regarded as an innovation in its own right, in this study we use the common more narrow definition that entails *a new product or process*.

The introduction of products or services to a foreign market often implies localisation of the product, and this in turn entails varying degrees of innovation (EIM, 2010). Trade and export support measures that target innovative SMEs (e.g. research intensive firms) obviously are also relevant to innovation. These could be effective in internationalising the business activities of SMEs that are already innovative.

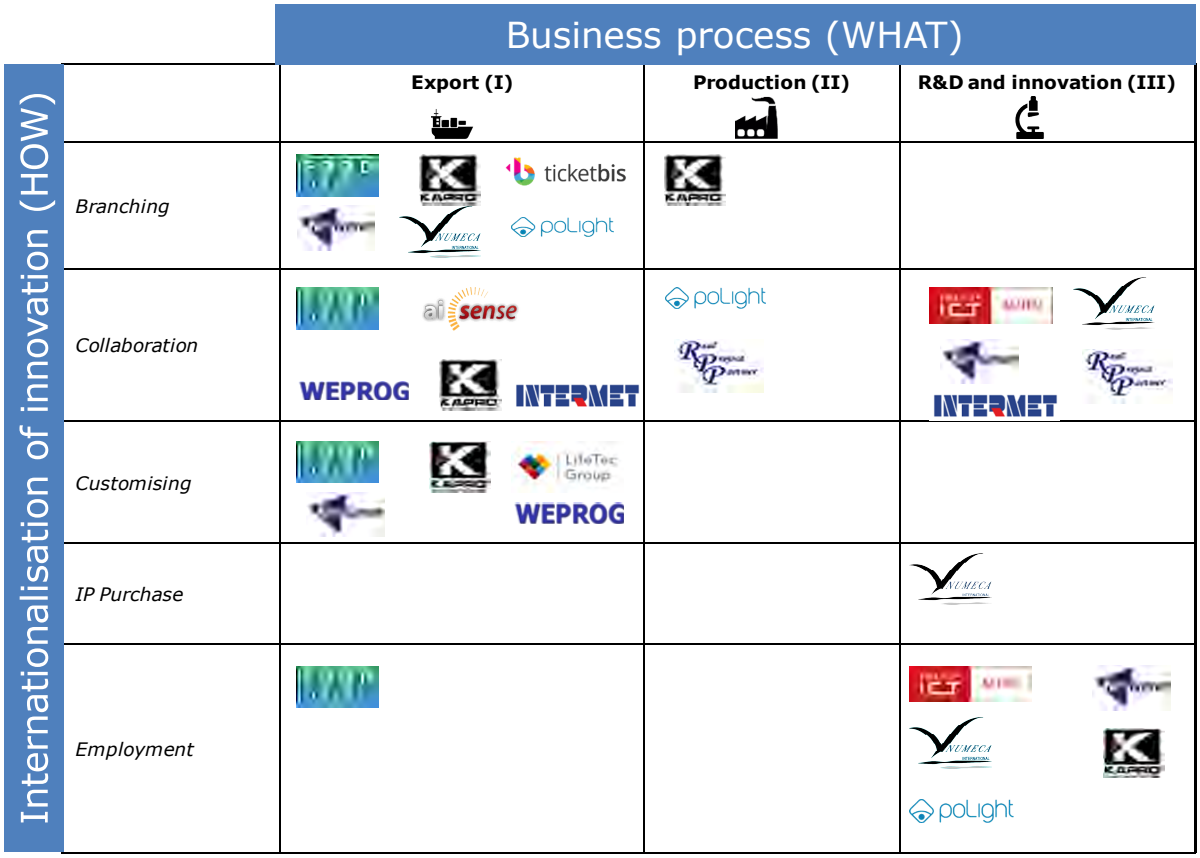
II. **Production.** SMEs can also manufacture their products abroad. Again, this may be done via local subsidiaries (branching) or local suppliers (collaboration). Production abroad requires a certain scale hence the natural trajectory for SMEs is first to grow domestically and then only to start investing abroad. The availability of relatively cheap labour is often an important driver for offshoring production. Offshoring is not limited to low skilled labour. Production is by nature closer to innovation than trade and export because it usually involves a lot of learning by doing which is the most important knowledge base for technology-based firms.

III. **Research and development and innovation (R&D&I).** Innovative SMEs may also collaborate with universities, research institutes or other enterprises abroad for research and development purposes. The collaboration could also involve the acquisition of 'embodied knowledge', that is, the hiring of foreign researchers. This could either be done on a project base (for specific research assignments) or on a structural bases (hiring of foreign talent). Firms could also acquire codified knowledge (IP purchase). However, such knowledge is rarely available off the shelf – it usually involves research collaboration. An important element is that because of the international character of its communities, research inherently has a global outlook. Consequently, it might be easier for innovative SMEs to internationalise research than production.

The relationship between the internationalization of sales, production and research and innovation is complex. The decision whether and how to internationalise a certain business process seems to be largely unrelated to the other business process. For example, an innovative SME might collaborate with foreign universities but still produce and sell its products at home. The other way around, a firm that produces its products abroad does not have to venture into international research collaboration.

If the innovative SMEs from Chapter 3 are mapped on a matrix of business processes in relation to types of internationalisation activities, it appears that each business process is related to a different set of activities. Nearly all SMEs sell their products abroad. They do so by either using a local sales subsidiary, or collaborating with a local sales agent, or both. Customisation is indeed a common activity and key to the internationalization of innovation in sales. It is however not automatically related to the internationalization of production. Kapro is the only firm that has a foreign subsidiary for production but the customization of products is done at its domestic plant. RPP collaborates with its foreign suppliers but only sells to its home market. PoLight is the only case where the foreign production is directly linked with customization. For research, collaboration and employment are the most frequent internationalization activities. Again, there is no apparent link with production. Numeca for instance, has a lot of international research collaboration; it also buys IP and hires foreign researchers as a result of that collaboration. Yet it chooses explicitly not to move its production abroad or customize its products to local markets. RPP is the only case where international collaboration on research and production are closely related but again, it does not export its products.

Exhibit 4-1: Case studies mapped on the matrix business processes x internationalisation of innovation activities



Source: Dialogic

In sum, although the various types of internationalisation activities are related they do not coincide for each of the three business processes. **An important issue is how the activities can be connected**, and how SMEs can move from trade & export (I) and production (II) to research and innovation (III). This issue will be the basis for the evaluation of the strength and weaknesses of the current portfolio of EU support measures in paragraph 4.3.

First, in the next sub-section we will classify the existing EU support measures according to the trichotomy of business processes. That is, for each policy measure we indicate whether it is primarily focused on export and trade, international production and/or international R&D collaborations.

We then classified the different policy measures on geographical focus, budget, direct/indirect measure, sector, and target group. The policy measures needed to support **internationalisation** activities **outside Europe** and be targeted at **SMEs**. Next, we identified the focus of these policy measures based upon the three different types of activities as described above (export & trade, international production and/or innovation) and tried to find evaluation studies of these different policy measures to see to what extent they were perceived as effective and efficient. Subsequently, the portfolio of measures was assessed, especially the overall balance: what are the strengths and weaknesses of the current portfolio of policy measures? Thereby, we mainly focused on the design of the current portfolio (the core concepts and core mechanisms). Due to a lack of evaluation studies it was difficult to take the implementation of the design into account. After all, well-designed instruments can be badly implemented.

Secondly, we analysed the most important trends in the environment, that is, the opportunities and threats. Opportunities emerge if a strength matches trends in the external conditions in a

positive way; a threat is a combination of a weakness with trends in the external conditions that may be harmful for achieving the objectives. The information for this phase was derived from desk research: a literature review (see section **Fehler! Verweisquelle konnte nicht gefunden werden.**) and interviews with exports in the field of global RDI. This resulted in the overview table in section 4.3.

4.2 An overview about EU support measures and infrastructure

In this paragraph we give an overview of the most important policy measures supporting internationalisation activities of SMEs outside Europe. We used the assessment by the European Commission of EU instruments contributing to the internationalisation of European enterprises as a starting point for our own stock taking of EU instruments, and combined this with insights from desk research (e.g. previous studies conducted on internationalisation of SMEs)[58]. This resulted in an overview of policy measures supporting the internationalisation of innovation of SMEs. These policy measures can be grouped under a few policy programmes of the European Commission.

Exhibit 4-2: Overview of main policy programmes encompassing policy instruments supporting SMEs internationalisation activities

Name	Running	Budget	Goal
COSME	2014-2020	2,300 million	A.o. supporting internationalisation and access to foreign markets. COSME e.g. funds the Enterprise Europe Network (EEN) and the SME internationalisation portal.
ICI & ICI+	2007-2010 2012-2013	172 million 32 million	Strengthening the EU relationships with strategic developing country partners (replaced by the Partnership Instrument as of 2015)
Partnership Instrument	2014-2020	954 million	Funding activities that carry EU agendas with partner countries forward, e.g. by providing technical assistance such as IPR issues, promoting business cooperation, innovation and knowledge management, as well as underpinning cooperation with international institutions.
FP7[59]	2007-2013	Ca. 9,000 million	Actions were encouraged across the entire field of science and technology, utilising a bottom-up approach. Two dedicated measures were implemented: • Research for SMEs: to support small groups of innovative SMEs in solving common or complementary technological problems. • Research for SME associations: to support SME associations and SME groupings in developing solutions to problems common to large numbers of SMEs in specific sectors. In addition, European businesses were able e.g. use the programme as a tool to internationalise by partnering with non-European companies and others to carry out joint research and innovation activities. In line with pre-established targets set by the EU Council and Parliament, over EUR 7.5

[58] E.g. ECSIP (2013). Study on Support Services for SMEs in International Business, on behalf of DG Enterprise and Industry, Rotterdam, March 22, 2013.

[59] See http://ec.europa.eu/research/fp7/index_en.cfm?pg=sme.

			billion was allocated to SMEs under the so-called FP7 Cooperation programme. Apart from stimulating cooperation of SMEs with other actors within the frame of the FP7 Cooperation Programme, the FP7 budget also topped-up the EUREKA / Eurostars I programme budget – facilitating market-oriented R&I cooperation for R&D performing SMEs – for ca. EUR 100 million. Marie-Curie fellowships were allowing researchers to be embedded in SMEs for a limited lapse of time. The Risk-Sharing Instrument (RSI) pilot under FP7 was a first financial instrument providing guarantees for loans to SMEs in order for them to deliver on their international innovation ambitions.
Horizon 2020	2014-2020	>10,000 million	The SME instrument[60] provides support in three different stages covering the whole innovation cycle. A feasibility part allows for an assessment of the technological and commercial potential of a project (proof of concept). Funding is provided in the form of a lump sum. A main grant supports an innovation project focusing on activities such as demonstration, testing, prototyping, pilot lines, scale-up studies, miniaturisation, design, performance verification etc. and market replication. The commercialisation phase is supported indirectly through accompanying measures aimed at facilitating access to finance and access to customers. Just as was the case under FP7, European businesses can e.g. use Horizon 2020 also as a tool to internationalise by partnering with non-European companies and others to carry out joint research and innovation activities. The expectation is that about EUR 6 billion will be allocated to SMEs through their participation to so-called Research and Innovation Actions (RIAs). Apart from stimulating cooperation of SMEs with other actors within the frame of RIAs, Horizon 2020's budget is also to top-up the EUREKA / Eurostars II programme –facilitating market-oriented R&I cooperation for R&D performing SMEs – for a maximum amount of EUR 287 million. In addition, the Marie-Sklodowska Curie actions and the Innovation Associate action under the INNOSUP-call allow researchers to become embedded in SMEs to enrich their international innovation potential. Lastly, InnovFin SME Guarantee and InnovFin SME Venture Capital are two financial instruments that help SMEs with international innovation ambitions to access the finance they need to turn these ambitions into reality.

[60] See http://ec.europa.eu/research/horizon2020/pdf/press/fact_sheet_on_sme_measures_in_horizon_2020.pdf.

The policy measures within these programmes supporting internationalisation activities of SMEs are discussed below. The tables show the focus of these policy measures: stimulating trade and export, stimulating international production and/or stimulating international R&D collaboration.

COSME

The most important and largest policy measures in support of internationalisation of SMEs are part of the EU programme for Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME) (2014 - 2020, €2.3 billion). The aim of this programme is to strengthen the competitiveness and sustainability of the Union's enterprises, including promoting internationalisation. It largely continues the activities started under the previous "Entrepreneurship and Innovation Programme (EIP)", like the Enterprise Europe Network (EEN), the Erasmus for Young Entrepreneurs, and the IPR helpdesk. See the table below for an overview of the different policy measures.

As can be seen in the table below, many COSME measures aim at providing information about foreign markets (regulations, local service providers) in order to help SMEs enter markets abroad. Thereby, many of these policy measures focus on export and trade because COSME aims to "give a fresh impetus for the European economy by easing access to credit for SMEs, improving SMEs access to markets inside and outside Europe and creating a favourable environment for SMEs". Furthermore, COSME "does not support research and/or innovation, while this is supported by Horizon 2020 programme. The two programmes complement each other"[61].

One of the few policy measures (also) focusing on international R&D- and innovation activities is the **Enterprise Europe Network**[62]. EEN has around 600 partners (SME support service providers) in more than 50 countries, helping SMEs to develop their business in new markets, source or license new technologies and obtain access to EU finance and EU funding. The network services focus on i) business cooperation (services to develop commercial cooperation between SMEs), ii) innovation and transfer of technology and knowledge (e.g. by means of research cooperation), iii) internationalisation beyond the EU (helping SMEs finding suitable business partners and enter new markets), iv) information (on internal markets and community initiatives) and v) feedback (providing feedback from SMEs to the EC to ensure that future legislation responds to the company's needs). Moreover, the Horizon2020 programme makes use of EEN as a provider of specific innovation services (e.g. further developing investment readiness, brokerage activities)[63].

The EU-Japan Centre for industrial cooperation e.g. uses the EEN to promote and support SMEs in their search for partners to bring innovative ideas to the market. The EU-Japan centre also promotes EU and Japanese cluster cooperation and through the JEUPISTE project, which promotes the Horizon 2020 programme in Japan and aims to promote cooperation in science, technology and innovation[64].

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[61] See http://europa.eu/rapid/press-release_MEMO-13-1035_en.htm and http://enterprise-europe.ee/wp-content/uploads/2015/12/Guide-to-EU-services-for-SME-internationalisation.pdf.

[62] For 2015 – 2020 the budget is 49 million euro per year for EU28 and COSME participating countries. There is no EU contribution for EEN Business Cooperation Centres.

[63] See for more information: http://een.ec.europa.eu/.

[64] See for more information: http://www.eu-japan.eu/.

Exhibit 4-3: Policy measures under the COSME programme

(*** = strong orientation, ** = some orientation, * = weak orientation, - = no relevance)

COSME 2014 - 2020		Annual budget (M, €)	Export & Trade	Production	R&D&I
Enterprise Europe Network (EEN) (2015-2021)	EEN is the largest network of business and innovation support organisations for the benefit of European SMEs. A new network has started in January 2015. There is a variety of events. e.g.: Missions for Growth: In a Mission for Growth, the Commissioner responsible for Enterprise and industry policies travels with a delegation of EU business representatives to a third country. Missions for Growth help European enterprises to better profit from fast growing emerging markets and are usually linked to renowned international brokerage events.	49,0	***	**	*
EU-Japan Centre for Industrial Cooperation	The mission of the EU-Japan Centre for Industrial Cooperation is to promote all forms of industrial, trade and investment cooperation between Japan and the EU, and to strengthen the technological capabilities and the competitiveness of the European and Japanese industrial systems.	2,6	***	**	*
Cluster internationalisation programme SMEs (2014-2020)	This programme includes a "Cluster Go International" action aimed to support the establishment of a number of European Strategic Cluster Partnerships that will lead to international cluster cooperation in fields of strategic interest and an action "supporting international cluster cooperation" through the further development of the web-based European Cluster Collaboration Platform.	2,7	**	***	*
Financial Instruments (EFG and LGF)	Through COSME EFG, the European Investment Fund invests in selected venture capital and private equity funds – acting as financial intermediaries – that provide funding to SMEs predominantly in their expansion and growth stages. Through COSME LGF, the European Investment Fund offers guarantees and counter guarantees to selected financial intermediaries to help them to provide loans and leases to SMEs which they would otherwise not support.	-	**	*	-

SME Internationalisation Portal	The Portal gives information on hundreds of service providers (at regional, MS and EU level) to support SME internationalisation activities. It also contains information about relevant programmes in 25 priority third country markets.	0,4	***	*	-
IPR Helpdesks	The IPR Helpdesks (for China, EASEAN and MERCOSUR region) provide advice for SMEs on intellectual property rights. The helpdesks offer first-line expert advice on IPR matters, liaison with outside experts and preparation of general and customised training.	1,4	***	*	-
Small Business Act (SBA)	A set of policy guidelines and recommendations to enable Member States to improve various aspects of the business environment for SMEs.	-	(*)	(*)	(*)
Network of European Business Organisations (EBO) in Third countries	The EBO Worldwide Network is the sole network representing EU-wide business interests in Third Countries.	0,1	***	**	-
Erasmus for Young Entrepreneurs (2014-2020)	This is a cross-border exchange programme which gives new or aspiring entrepreneurs the chance to learn from experienced entrepreneurs running small businesses in other Participating Countries.	7,9	*	***	-
Connect Project by the European Business & Innovation Centre Network (EBN) (2013-2015)	EBN will recruit and assist European New Entrepreneurs who will benefit from a minimum stay in Brazil of 1 month (up to 6 months), and also select European Host Entrepreneurs.	0,73	*	***	-

The **Cluster Internationalisation Programme for SMEs** supports European SMEs in global competition. The goal of the cluster international action is to encourage European clusters to work together to exploit synergies across borders and sectors and develop a joint internationalisation strategy. Thereby it focuses on specific third markets and key areas for EU industries. The European Cluster Collaboration Platform will also be further developed, with the intention to facilitate the integration of European SMEs in global value chains[65].

[65] See for more information http://www.clustercooperation.eu.

ICI & ICI+

In the period 2007 – 2013, the **Industrialised Countries Instrument** (ICI) has been the main vehicle for cooperation with 17 industrialised and other high-income countries and territories, especially in North-America, Asia Pacific and in the Gulf region. In the ICI+ programme the focus is extended to non-ACP developing countries[66]. Within this programme several policy measures can be identified that are supporting the internationalisation of SMEs (see the table below). Most of these policy measures are mainly focused on stimulating export and trade-relations and less on stimulating R&D and innovation (including customisation).

An exception is the European Business and Technology Centre (**ETBC**) in India. The mission of EBTC is to assist the Business, Science & Research Community – in Europe and India – to work together towards generating new business opportunities in clean technology transfer, and establishing business relevant cooperation in the field of research, science and technology. The EBTC is the lead partner for the Enterprise Europe Network (see above); it has an IPR Helpdesk and offers expert consultations, market exploration trips and collaborative project opportunities. The European **Technology Experience Centre (ETEC)** is an ecosystem set up by EBTC[67] to support EU and Indian companies and research institutes. ETEC supports companies with market research and it also provides an entrepreneurial incubation space ('innovation zone') where companies and research institutes can meet, innovate and explore opportunities for joint business and research[68].

The **ELAN** programme tries to increase and diversify the EU economic presence in Latin America, by meeting the Latin American demand for knowledge and innovative technology. ELAN also aims to boost the opportunities that both markets offer for European and Latin American SMEs, through two interdependent strategies: i) European and Latin American Business Services and ii) the ELAN network. The first focuses mainly on providing SMEs with relevant information about doing business in Latin America (focus on trade and export). The latter brings together key European and Latin American research and innovation actors, who promote technology based transformation processes and economic growth[69].

ICI+ has been replaced by the Partnership Instrument (see below) as of 2015, but the programme will continue for of couple of years until all projects have ended.

Exhibit 4-4: Policy measures under the ICI and ICI+ programme

(*** = strong orientation, ** = some orientation, * = weak orientation, - = no relevance)

ICI		Annual budget (M, €)	Export & Trade	Production	R&D&I
EU-GCC Trade and Business Cooperation facility	The overall objective of this facility is to strengthen EU-GCC (Gulf Cooperation Council) sustainable trade, investment and business cooperation, through creating stronger business to business links (trough match making events) and policy dialogues.	0,4	***	**	-

[66] African, Caribbean and Pacific (ACP) region.

[67] The European Business and Technology Centre (EBTC), launched in 2008, is a programme co-funded by the EU and coordinated by the EuroChambres. See also: http://ebtc.eu/index.php/about-ebtc.

[68] See http://ebtc.eu/index.php/services/technology-incubation.

[69] See http://www.elannetwork.org/.

European Business and Regulatory Cooperation (EBRC) with Taiwan	The first objective is to enhance the regulatory environment for trade and investment in Taiwan and to promote European solutions and disseminate best practices for regulatory issues. The second objective is to enhance the visibility of the EU in Taiwan by organising business and economy related events.	0,1	***	*	-
EU Business and Information Programme with Hong Kong/Macau	The general objective of the Business Information Programme is to strengthen economic partnership and business cooperation with Hong Kong and Macao and ensure a stronger and coordinated representation of European business. A second objective is to promote the visibility and projection of the EU image.	0,1	***	**	-
ICI+		Annual budget (M, €)	Export & Trade	Production	R&D&I
European Business and Technology Centre (EBTC) in India	EBTC offers solutions to clean-technology companies willing to enter and ensure sustainability in the Indian market. EBTC's services support cross-border collaboration.	1,7	-	**	***
European and Latin American Technology based Business Network (ELAN)	The ELAN Network is a space for collaboration, co-generation and development of technology based business opportunities between Europe and Latin America. It brings together key European and Latin American research and innovation actors (R&I), who promote technology based transformation processes and economic growth.	3,7	*	**	***
SME Centre in China	Consortium of mainly China-based pan- and bilateral European business support structures (led by the British Chinese Business Association).	1,1	***	*	-
European Association for Business and Commerce (EABC) in Thailand	Consortium of mainly locally based bilateral MS chambers of commerce (led by the German-Thai chamber). Designed to be the equivalent of a local European Chamber of Commerce.	0,3	***	-	-
European Chamber of Commerce in Myanmar	Consortium under the lead of the French-Burmese bilateral chamber of commerce, with EU-based EuroChambres as partner.	0,9	***	-	-

EuroCham (Malaysia, Philippines, Laos, Cambodia, Indonesia+)	Activities: "single voice of European business/advocacy", "first entry support for European SMEs", combined with pro-active dissemination and outreach activities directed at EU-based SMEs.	3,3	***	-	-
European Indonesian Business Network (EIBN)	Grant contract with a locally-based consortium of EU MS bilateral chambers, to handle the "first entry support and outreach". The consortium is led by the German-Indonesian Chamber.	0,5	***	-	-
European Vietnamese Business Network (EVBN) Vietnam	The overall objective of EU-Vietnam Business Network (EVBN) is to increase exports and investments of the European Union (EU) to Vietnam in particular by Small and Medium Enterprises (SMEs) as well as strengthening the EU Business sector in Vietnam by facilitating market access.	0,8	***	-	-

Partnership Instrument (FPI), IPA II en ENI

The Partnership Instrument (2014 – 2020, €951 million) is a relatively new instrument with the aim to support the EU's effort towards enhanced engagement with EU strategic partners and emerging economies, e.g. by promoting global standards (regulatory co-operation); by helping to strengthen EU Market Access Teams on the ground; by fostering policy dialogue and technical assistance on e.g. IPR issues; by promoting business co-operation; and by innovation and knowledge management, as well as stimulating co-operation with international institutions[70]. Overall, PI has four main objectives:

- Offering policy support and responding to global challenges;
- Projecting the international dimension of Europe 2020;
- Enhancing market access and boosting trade, investment and business opportunities for EU companies (including SMEs);
- Promoting public diplomacy and academic cooperation: e.g. international mobility, joint degrees, and international cooperation partnerships (including capacity building and staff development).

Many actions within the partnership instrument focus on stimulating export and international trade, e.g. assisting EU companies in gaining a better understanding of the local business culture, market rules and practices, legal analysis and advice or by creating business links. A smaller number of policy instruments focus on **internationalisation of innovation**, like the projects "Clean energy cooperation with India" and "low carbon business action in Brazil and Mexico" (in 2014). The first project focused on creating opportunities for European businesses in the energy technology sector (renewables, energy efficiency, electrical network equipment). The latter focused on facilitating the adoption of low emission technology by existing industries. It also facilitates industrial cooperation between low emission solution providers from the EU and industrial partners, resulting in long-term cooperation between clusters and their member SMEs, research centres, science parks and incubation centres etc.

[70] See http://ec.europa.eu/dgs/fpi/what-we-do/partnership_instrument_en.htm.

In the annual plan 2015, a number of actions are relevant for European SMEs willing to internationalise their activities. The most important ones (however mostly limited to trade and export) are the project "international urban cooperation" and the EU-South Asia aviation cooperation, the support to the implementation of the EU-Canada Comprehensive Economic and Trade agreement and Technical Assistance and Information Exchange[71].

Exhibit 4-5: Policy instruments within the Partnership instrument

(*** = strong orientation, ** = some orientation, * = weak orientation - = no relevance)

Partnership instrument		Annual budget (M, €)	Export & Trade	Production	R&D&I
Clean Energy Cooperation with India (CECI)	The project aims to enhance India's capacity to deploy low carbon energy production and improve energy efficiency.	5,0	-	*	**
Low carbon business action in Brazil and Mexico	These projects help to establish and expand emerging industries that can deliver low emission technologies and solutions and facilitate industrial cooperation, resulting in long-term cooperation between clusters and their member SMEs, research centres, science parks and incubation centres, etc.	4,5	-	*	**
EU-China Aviation project	This project aims to support European aviation industry in China by facilitating access to the biggest aviation growth market and by contributing to a continued high level of aviation safety. Areas of intervention include regulatory and technical cooperation.	10,0	-	*	**
International urban cooperation	Promotes business opportunities, cluster cooperation and technology transfer.	20,2	-	*	**
EU-South East Asia civil aviation project	Provide a more compatible and open market for European aviation industry in south East Asia.	7,5	-	*	**

[71] European Commission (2015). Commission implementing decision of 22 June 2015 on the 2015 Partnership Instrument Annual Action Programme for cooperation with third countries to be financed from the general budget of the European Union.

EU Gateway/Business Avenues in South East Asia	Building on the EU Gateway programme model, this project promotes trade and business cooperation with South East Asia and creates valuable business links for European SMEs with emerging markets in the region.	25,0	***	**	-
Green Gateway to Korea	This projects specifically focuses on a) Facilitating trade and business cooperation with Korea; b) Assisting EU companies, in particular SMEs, to create business links in Korea in clean technologies, products and services; c) Assisting EU companies in gaining a better understanding of the local business culture, market rules and practices.	20,0	***	**	-
Market Access database	Information for EU exporters on import conditions in non-EU markets.	7,0	***	-	-
Green Gateway to Japan	Strengthen the presence of European businesses in Japan	10,0	***	**	-
EU Gateway to China	Gateway to China is a pilot project. Through it, business missions for EU companies (mainly SMEs) to China will be organised (expected 4 business missions for around 200 companies). The project will provide coaching and targeted information to selected companies.	5,0	***	**	-
Market access and trade & investment agreement negotiation & implementation facility	The objective is to provide assistance in the field of trade: legal analysis and advice, expertise to support delegations coordinating Market Access Teams, translations, statistics and collection of data and analysis, expert seminars, workshops, technical assistance to support partner countries implement necessary reforms, monitoring of trade agreements.	2,0	***	-	-

Public Procurement Initiative	This initiative aims to improve the availability, coverage and quality of data on public procurement (including on cross-border access to public markets). At a second stage, the project will also look into the identification of policy instruments and practices that restrain market access in third country public procurement markets.	4,5	***	-	-
Technical Assistance and Information Exchange (TAIEX)	The objective is the implementation of EU bilateral cooperation agreements or similar policy agreements, with a focus on regulatory convergence in partners countries, to share with them experience, know-how and information on EU policies and to support the implementation of mutually agreed commitments.	1,0	***	-	-
Resources efficiency initiative in India	Promotion of EU standards and business best practices	2,5	-	-	(*)
Policy dialogue support facility EU-China	Facilitate economic and trade relations with partner countries	6,5	***	-	-
Feasibility study for an EU-CANADA mineral investment facility	Support the raw materials initiative objective of guaranteeing supply of raw materials for the EU industry	1,0	-	*	*
Support to CETA implementation & EU Chambers' coordination	Enable EU companies in Canada to take full advantage of CETA	1,0	***	-	-

The Instrument for Pre-Accession Assistance II (2014-2020, €11,7 billion) supports reforms in the enlargement countries with financial and technical help and builds upon the results already achieved by IPA I (2007-2013)[72]. One of the pillars focuses on 'growth and competitiveness', by aiming to attract foreign investments, improve access to finance, increase clustering, networking and SME internationalisation. Moreover, the European Neighbourhood Instrument (2014-2020, €15,4 billion) promotes the enhanced political cooperation and economic integration between the EU and neighbour counties. Many instruments focus on the South Mediterranean, like the Euro-Mediterranean Trade and Investment Facilitation Mechanism.

[72] Current beneficiaries are: Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Kosovo, Montenegro, Serbia and Turkey.

Seventh Framework Programme and Horizon 2020

The Seventh Framework Programme (FP7) was the EU's main instrument for funding research in Europe, running from 2007-2013. The objectives of FP7 can be grouped into four categories: "Cooperation", "Ideas", "People" and "Capacities". For each category, there is a specific programme that corresponds to one of the main areas of EU research policy. In relation to internationalisation of innovation, the first – oriented towards different types of entities working together on research and innovation projects providing value-added for the EU – and the last programme – aimed at capacity-building for both RTD-intensive SMEs and SME associations – are most interesting.

As for the latter, the concrete actions were aimed at improving Europe's research infrastructure and the research capacity of SMEs: "**Research for the benefit of SMEs**". It also hosted smaller programmes relating to Science in Society, Regions of Knowledge, Research Potential, International Cooperation, and the Coherent Development of Research Policies. Two SME specific schemes were implemented:

- *Research for SMEs*: This scheme supported small groups of innovative SMEs to solve technological problems. Projects, relatively short term, were focused on the innovation needs of the SMEs which outsource research to RTD performers and needed to demonstrate a clear exploitation potential for the SMEs concerned.
- *Research for SME associations*: This scheme supported SME associations to develop technical solutions to problems common to a large number of SMEs in specific industrial sectors or segments of the value chain through research needed. These projects, could have a duration of several years and were driven by the SME associations which outsource research to RTD performers for the benefit of their members. The projects needed to involve a number of individual SMEs.

The new EU programme for research and innovation, **Horizon 2020**, provides funding for every stage of the innovation process from frontier science to close-to-market innovation. The programme is designed around three pillars: excellent science (ES), industrial leadership (IL) and Societal Challenges (SC). The participation of SMEs is particularly promoted in these last two pillars.

It is expected that 20% of the total combined budget for all societal challenges and the enabling and industrial technologies (LEITs) will go to SMEs. As such, some € 9 billion in EU support for Research and Innovation activities will find its way directly to SMEs, most of them part of consortia participating in EU collaborative Research and Innovation projects. About one third of this amount will be allocated to SMEs through a **dedicated SME instrument** that encourages ambitious for-profit companies to put forward their most innovative, high-potential ideas with an EU dimension that cannot find financing on the market because of its high-risk character.

In addition, there is a series of actions bundled under the specific objective **'Innovation in SMEs'**[73] which focuses on optimising the research, development & innovation environment for SMEs. The goal is to strengthen the innovation capacity of SMEs and creating economic and societal value. The work programme 2014-2015 focused e.g. on promoting SMEs' innovation activities from concept to market, addressing the financing needs of internationally oriented SMEs. The **'Call - for a better innovation support to SMEs' (INNOSUP)** funds a battery of capacity-building and indirect support actions to SMEs oriented towards improving the innovation eco-system for SMEs across the EU**.** The aims of the latter include providing Member States and regions with opportunities to enhance their services through collaboration, peer-learning and uptake of new approaches. In the work programme 2016-17, emphasis is put on testing new approaches to a better innovation support in large pilot actions that should deliver results in time for the start of the

[73] See https://ec.europa.eu/programmes/horizon2020/en/h2020-section/innovation-smes.

discussion on the next framework programme for research and innovation. This objective 'innovation in SMEs' also includes support to the second **EUREKA/Eurostars Joint Programme Initiative** (2014-2020) that provides funding for market-oriented transnational collaborative projects of R&D performing SMEs.

Moreover, the **Fast Track to Innovation** (FTI) pilot is a fully bottom-up measure in Horizon 2020 to promote close-to-the-market innovation activities. An important factor in the evaluation of the proposals is the size of the budget allocated to industry participants (especially SMEs).

Part of the H2020 budget (3.7%) is not provided through grant funding, but via financial instruments branded as **InnovFin - EU finance for innovators**. The support takes the form of risk-sharing (for loans and guarantees), risk finance (equity) or advisory services. The goal is to stimulate more investment in research and innovation, notably by the private sector, in high-potential but high-risk businesses – in particular SMEs – and projects. This EU finance for innovators (InnovFin) is provided through the European Investment Bank (**EIB**) and the European Investment Fund (**EIF**). The InnovFin products for SMEs that are currently in place are expected to trigger at least EUR 11 billion in finance for R&I in SMEs, through leverage and multiplier effects of the Horizon 2020 budget resources.[74]

Last but not least, two Marie Sklodovska-Curie actions (IAPP and ITN) are promoting Business-Academic collaborations focusing on giving researchers the adequate skills and opportunities to contribute to SME and other business growth.

Bilateral cooperation

The European Union also has concluded **bilateral S&T agreements** with a number of individual countries. These agreements constitute a framework and a privileged forum to identify common interests, priorities, policy dialogue, and the necessary tools for S&T collaboration[75].

One of the examples is the science and technology agreement between the EU and China (renewed in November 2009 for another five-year period), the China-EC Science & Technology Partnership scheme (March 2010), the Joint Statement to implement research on new and renewable energy and innovation cooperation, encouraging in particular **SME participation** (8th of December 2010) and the EU-China Joint Declaration on Innovation Cooperation Dialogue (September 2012). The bilateral cooperation also results in programmes dedicated to the stimulation of R&D cooperation, also supporting the internalisation of innovation of SMEs[76], like:

- Dragon Star: Dragon Star identifies and demonstrates mutual interest and benefit in the cooperation between the EU and China sharing best practices via workshops and presenting the state of the art and the prospects for cooperation in particular fields.
- CHINAACCESS4EU: The main goal of this project is to help develop the reciprocity aspect of the EU-China Science and Technology agreement by identifying the Chinese programmes open to EU researchers and promote their participation, and to provide outputs useful in the context of the Joint Committee meetings of the EU-China Science and Technology agreement.
- INCO LAB: This is a European Commission Subsidized International Scientific Cooperation Program, with Chinese and European Academic Laboratories.

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[74] The European Fund for Strategic Investments (EFSI) is accelerating the implementation of this access to finance for innovation support, and is also adding to it (expected to increase the amount mentioned with another couple of billions in extra investments triggered).

[75] See http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=countries.

[76] See http://ec.europa.eu/research/iscp/index.cfm?pg=china.

In addition, the EU and China recently launched a new co-funding mechanism for research and innovation for the period 2016-2020. The European Commission expects to continue spending over 100 million Euros per year for the benefit of Europe-based entities in joint projects under H2020 with Chinese participants. China will match corresponding resources and expects to spend 200 million RMB per year for the benefit of Chinese based entities that will participate in joint projects with European entities under Horizon 2020.

There is also a special co-funding mechanism for research and innovation between the EU and China. The co-funding mechanism aims to support joint research and innovation activities on topics in strategic areas of common interest and mutual benefit, such as food, agriculture, biotechnology, green transport – including aviation, sustainable urbanisation, information and communication technologies, energy, health and mobility of young researchers. Cooperation in S&T forms a vital part of the comprehensive EU-China relationship and science and innovation fuels economic growth and social development[77].

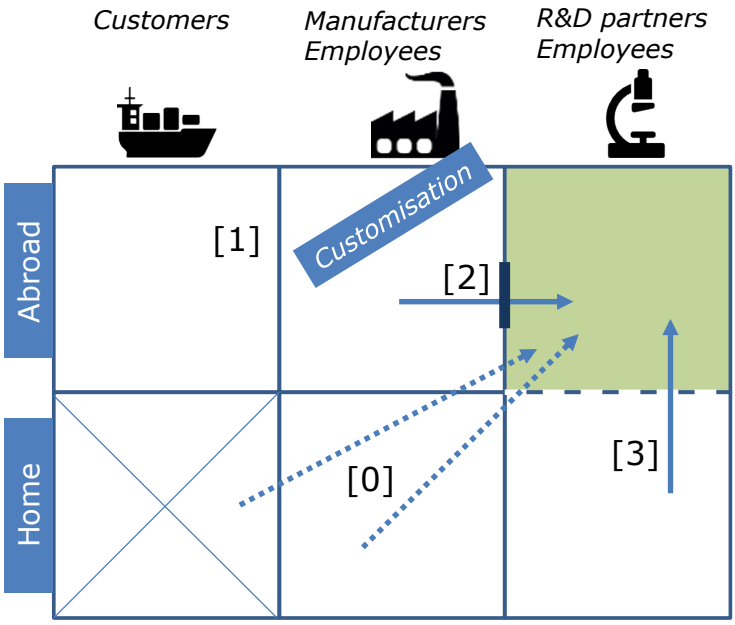
4.3 Assessment of relevant European policy measures

4.3.1 Trajectories towards internationalisation of innovation

A majority of the researched policy instruments for internationalisation focus exclusively on export and trade promotion (I). Only a few policy measures are aimed at stimulating international production (II) and even less on stimulating internationalisation of research and innovation of SMEs (III). Whether this is a weakness depends on the interconnection (or lack thereof) between the internationalisation activities within the three business processes.

Based on the literature review and the case studies we tentatively conclude that there are different trajectories for firms to internationalise innovation activities.

Exhibit 4-6: Different ways towards internationalisation of innovation activities



Source: Dialogic

[77] 2nd EU-China Innovation Cooperation Dialogue, Brussels 29th June 2015, Joint Statement.

The first trajectory [1] would be to move from trade and export to research and innovation abroad. This is a very difficult step that is rarely found.[78] Trade and export and research and innovation are just two different beasts. The only relevant type of internationalisation activity is customisation. The question is to what extent the adaptation of a product or service to the specific needs of a local market leads up to genuine product innovation.

The second trajectory [2] is to move from production to research and innovation. There is often a continuum between production and R&D collaboration but there is no *automatic* continuum. On the contrary, over recent decades the two have decoupled (Parilli et al., 2012). For firms it is a critical strategic decision whether to move R&D and innovation abroad. For multinationals, which have tight control over their global units, this is less of a concern. Literature on global value chains suggests that lead firms keep strategic activities in-house or close to come and disperse only the non-strategic activities (Schmitz & Strambach, 2009). Nevertheless, due to the recent trend of 'reverse innovation' MNCs no longer only transfer non-strategic, second order (lower level) tasks to rising powers like India and Brazil but also high-level development activities (Lema et al., 2015).[79] However 'reverse innovation' is only relevant within global innovation networks. It is found to be not relevant to SMEs that do not command such global networks. Thus most SMEs might be wary to move their innovation activities abroad – for instance in the hunt for talent they would rather move foreign research(ers)/employees to their home base (see especially the Numeca case).

The third trajectory [3] is to internationalise existing domestic research and innovation activities.[80] SMEs will usually first engage in innovation collaboration with a local university, public research organisation and / or other businesses. Then, via the knowledge network of its partners it could either directly or indirectly get involved in international innovation collaboration. In this respect, SMEs could piggyback on the networks of (larger) universities, public research organisations and multinational companies that are already much more internationally oriented.

It is very difficult for a non-innovative SME to move directly into international innovation [0]. Policy support measures should therefore either target non-innovative SMEs that already operate outside the EU, or innovative SMEs that do not yet do so. Trajectories I and II especially apply to the first group of SMEs. This suggests that due care should be taken for customisation in export and trade support measures. Moreover, traditional export promotion measures such as trade missions could also be targeted towards the second group. However, this often requires adapting these generic instruments to the specific needs of innovative SMEs.

Trajectory [3] obviously refers to the second group. The opposite now applies: It is the element of internationalisation that should be brought into policy measures that are geared towards research and innovation.

The trajectories do not exclude each other but will not coincide naturally. Due to their dominant knowledge base (science-based, technology-based or market-based), firms will also be focused on either research, production or sales (Lie, Chaminade and Asheim, 2013). The trajectories could be used in parallel and could then also reinforce each other. However, this requires careful

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[78] This statement was strongly endorsed by the respondents from our online expert survey. Over 80% (fully) agreed that it is a big step from SMEs from merely conducting trade and export to also conducting research and innovation abroad. With regard to the great difference between trade and export and research and innovation one respondent commented that "[the] challenge is [in] finding effective access to customers, [so] why focus on research which few are doing?"

[79] Reverse innovation refers broadly to the process whereby goods developed as inexpensive models to meet the needs of developing nations are then repackaged as low-cost innovative goods for Western buyers (Govindarajan and Trimble, 2012).

[80] As one of the respondents to the survey commented: "if a SME is already conducting R&D in its home market (e.g., if it has a dedicated R&D unit or infrastructure), expanding these activities to foreign markets should not be too difficult. Most SMEs, however, do not have a dedicated R&D unit nor a systematic innovation process."

coordination at the EU programme level (across all support measures for internationalisation; trajectory 1, 2 with 3). Given the importance of local support services in preparing SMEs before they go abroad (EIM, 2011), coordination is also required between the local, regional, national and European level. To be most effective, these local support services should be aligned to a coordinating body at EU level. This organisation should be responsible for mapping existing services (in order to identity gaps and overlap), put in place codes of conduct and agreement, and set up and maintain an efficient referral mechanism across individual support measures and administrative boundaries.

4.3.2 Good practice examples at the national level

Before evaluating the existing EU support measures that are relevant to the internationalisation of innovation we describe a number of best practices at the national level. This is helpful to put the strength and weaknesses of the EU measures into perspective and to guide the description of the opportunities.

We used the database of good practices of the Small Business Act as a starting point to search for effective policy measures at the national or local level. This database contains policies, projects or instruments particularly targeted at SMEs (or at least take SMEs' needs into account). In order to be indicated as 'good practices', these policies should at the least proven to have delivered tangible results; to be transferable and have clearly outperformed other practices in terms of efficiency and effectiveness or improved the situation for SMEs in that country[81]. The good practices can be filtered on "internationalisation". Some of the policies also received a European Enterprise Promotion Award (or were nominated), rewarding those policy measures which promoted entrepreneurship and small business at the national, regional and local level. In addition, we also searched for national examples via the different national policy agencies. This resulted in the following examples.

Internationalisation support project: Business Cooperation for International Innovation (Spain)

This internationalisation support project is executed by the Centro Europeo de Empresas e Innovacion del Principado de Asturias (BIC Asturias). BIC was established in 1994 to promote innovative companies by supporting entrepreneurs with providing different services (e.g. training, assessment and financing). It has been a part of the European Business and Innovation Centre Network since its foundation and also part of the Spanish national association of BICs (ANCES)[82].

Within the project 'Business Cooperation for International Innovation', SMEs are engaged in identifying opportunities for innovation, projects and consortia at international level and in alleviating the difficulties experienced by Asturian SMEs in joining stable, high-added-value partnerships and in taking part in joint innovation and technological development programmes. The project comprises a number of stages: an initial broad-based stage for selecting the participating SMEs; a stage involving the 'technological diagnosis' of those SMEs; a stage during which potential partners are sought and identified; and a final stage in which those SMEs take part in research, development and innovation cooperation projects. Continuous comprehensive assistance is provided, including the identification of opportunities for participation; general training activities and learning about international technological cooperation programmes and negotiation with project leaders concerning incorporation into consortia; advice regarding intellectual property; and the management of additional aid. Its results-driven strategy is a key sustainability element and

[81] See http://ec.europa.eu/growth/tools-databases/sme-bestpractices/SBA/index.cfm?fuseaction=welcome.detail.

[82] See http://www.ceei.es.

the methodology is readily adaptable to funding programmes. Through internationalisation, businesses improve cooperation and the management of, and investment in, R&D and innovation. This is a practice transferable to the European and regional levels; it is of interest to innovative SMEs and it has been presented at a number of events.

Global start up competition 'Get in the Ring' – Erasmus Centre for Entrepreneurship (Netherlands)

Get in the Ring is a global start up competition, in which start-ups are scored on their team, achievements, business model & market and their financials. The Dutch edition is organised by the Erasmus Centre for Entrepreneurship (ECE), which is fully owned by the Erasmus University Rotterdam. The ECE was awarded with a European Enterprise Promotion Award in 2014. It offers a learning environment where companies become better at entrepreneurship by gaining new insights and turning ideas into innovations. It's the largest expertise centre in entrepreneurship in Europe. The ECE Campus is home to more than 50 innovative companies and the stage for many entrepreneurship events. The Get in the Ring competition is an interesting example of one of the activities organised, while it promotes an international orientation among SME entrepreneurs. Furthermore, ECE built an infrastructure to foster ambitious entrepreneurship and empower a global community of 20.000 entrepreneurs who can solve worldwide challenges – creatively and effectively. Through its programmes, it also promotes cross-border knowledge exchange.[83]

Netzwerk Hessen-China – promoting scientific collaboration (Germany)

This is a good example of a policy instrument focusing on stimulating international research collaboration (and not as many other policy instruments focusing solely on export and/or trade promotion). Network Hesse-China is a community of business enterprises, public institutions and universities. The objective of the Network is to promote and intensify commercial, cultural and scientific relations between Germany, Europe and China. The initiative was rewarded with an Enterprise Promotion Award in 2013. The cooperation of German and Chinese companies in the sciences has resulted in the setting up of research teams and working groups in the field of nanoscience. Export activity has witnessed a sharp increase, which can be contributed to driving forces such as project start-ups in the automotive and transport engineering sector, and within the renewable energy/ energy efficiency markets. As a result of the Hesse-China network and the support it offers, German companies have made direct investments in China. The network has also hosted Chinese delegations and accompanied them on visits to Germany.[84]

Norwegian Industrial Research and Development Contracts (IRD) (Norway)

This policy instrument is a good example of piggybacking on fast growing and considerably more international SMEs. Innovation Norway, a government-funded company supporting growth, innovation and internationalisation of Norwegian SMEs, set up a support scheme called 'Industrial Research and Development Contracts' (IRD, nominated in 2010). An IRD contract is a binding agreement between companies to collaborate in the development of a new product, process or service. An IRD contract can only be granted to projects of an exceptional level of innovation and value creation, clearly defined market potential and high additionality. This support measure enables SMEs with high-growth potential to penetrate international markets with new and innovative solutions. The IRD scheme provides grants to R&D-projects where an SME supplier teams up with a demanding, larger and preferably international customer. In recent years, more than 200 projects have received an annual IRD funding. An external evaluation of ten years of the IRD shows that over 80 % of the projects were technologically successful. It also found that over

[83] See http://ece.nl.

[84] See http://www.hessen-china.de.

44% of the IRD projects had developed a new product or service that had penetrated the targeted markets. The projects involve an international customer in more than 25% of the cases[85]. According to the reviewers of the good practices of the Small Business Act, the originality of the IRD relies on the fact that it allows SMEs to match technology and market driven innovation processes by supporting technological development with a clear international market potential.

Partner Matching Services MATIMOP (Israel)

MATIMOP is a National Agency in Israel for industrial R&D cooperation. As discussed, it is for an SME with limited or no international experiences and finds it difficult to step into the world of international research collaboration. One important reason is that without international experiences, their (international) network is not sufficient to find the right partners. To bridge this gap, MATIMOP provides assistance to Israeli companies that desire to locate suitable partners for international collaboration.[86] MATIMOP has implemented several instruments to achieve this. One important instrument is their extensive database with contacts of Israeli & International Companies. Besides that, it also uses more specific instruments (in terms of technology and/or country) like building online communities to connect entities all over the world that share interests and common goals, like the Americas-Israel Innovation Networker[87], or setting up bilateral programs for collaborative industrial R&D ventures of which one of the goals is to identify potential R&D partners.

Mobility for Growth – supporting transnational mobility for experienced researchers (Sweden)

The aim of this programme (2012-2018), executed by the Swedish VINNOVA, is to support career development for individuals through mobility. The programme has a funding mechanism for incoming and outgoing transnational mobility for experienced researchers (including a reintegration phase for outgoing mobility), and it promotes active international collaborations between involved organisations[88]. By supporting the career development for individuals through mobility, this policy instrument focuses on the importance of personnel skills and experiences. In both the public and private sector there is an increasing demand of highly skilled workforce. "The programme is expected to result in the presence of significantly more research-qualified individuals who can become future leaders in public and private R&I organisations" (VINNOVA, 2014). To achieve this, the programme promotes transnational mobility (alongside other mobility flows) and targets only experienced researchers. By this policy instrument, the international orientation among entrepreneurs is promoted and international knowledge networks are created.

Women in Global Business programme (Australia)

Promoting the international orientation among entrepreneurs is important. Many entrepreneurs are successful in running their own business at a national level but lack the experience and network to go abroad. Women in Global Business (WIGB) is a national program that supports Australian businesswomen in taking their products and services to the world. WIGB is funded by the Australian Trade Commission (Austrade) and delivered in partnership with Australia's state and territory governments. The support consists of: a mentoring program (that connects business woman with little or no international experience with others who already have a lot of experience in international trade and investment), annual meetings to exchange knowledge, research,

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[85] See http://nordicinnovators.com/ifuofu-uk.

[86] See http://www.matimop.org.il.

[87] See https://memeni.com/communities/MATIMOP/americas-israel-innovation-networker.

[88] See http://www.vinnova.se/en/Our-acitivities/Innovativeness-of-specific-target-groups/The-Knowledge-Triangle/Mobility-for-Growth/.

international engagement activities (e.g. the first WIGB international chapter: WIGB Indonesia), and tools (like the global opportunity tool, mapping globalisation and Grand Finder).

Bilateral Science & Technology Centres (India)

The Science & Technology International Cooperation Division of the Department of Science and Technology (DST) has the mandated responsibility of (i) negotiating, concluding and implementing S&T Agreements between India and other countries; (ii) providing interventions on S&T aspects in international forums. The Department currently has three bi-national S&T Centres which are independent entities established under inter-governmental bilateral agreements with France, USA and Germany.[89] While many of these type of bilateral (or multilateral) S&T centres mainly focus on the execution of R&D projects, the DST explicitly mentions various modes of cooperation: joint workshops/seminars, fellowships/internships, access to advanced facilities, exploratory visits etc. As a result, these centres have a wider reach among businesses; while MNEs can take part of big R&D projects, it also tries to upscale SMEs into internationally oriented business.

4.3.3 SWOT-analysis of existing EU support measures

Based upon existing review studies, the case studies and the best practices we assessed the strengths and weaknesses of this portfolio of EU instruments that support internationalisation of innovation of SMEs. In addition, we examined the possible opportunities and threats. The results of this SWOT-analysis are summarized in Exhibit 4-6.

Exhibit 4-7: Overview of SWOT analysis EU portfolio of policy measures in support of Internationalisation of SMEs

Internal	Strengths	Weaknesses
	• A diverse portfolio (with a mix of instruments focusing on export & trade, production and innovation). • Accessible for all sorts of SMEs. • Collaborative R&D and innovation policy measures effectively stimulate cooperation (focus on networking). • Continuing clear focus of H2020 on R&D&I (with internationalisation as a side effect but not as a main goal in itself) • Several countries have national policy instruments stimulating participation of SMEs in EU programmes (e.g. Horizon 2020).	• Strong focus on trade and export which is only weakly linked to innovation. • Many coordination and support instruments predominantly aim at trade promotion, do not target innovative SMEs and are not adapted to the specific needs of innovative SMEs. • Within trade and export promotion measures there is little attention for (upgrading) customisation. • Little attention yet for human resource management (employment). • Complexity of EU policy measures hinder access for SMEs (witnessed by the fact that many national programmes have sprung up to supporting SMEs in this area). • EU policy instruments on research and innovation and on internationalisation are not sufficiently designed in conjunction. • National and EU policy measures are not sufficiently coordinated.

[89] See http://www.dst.gov.in/international-st-cooperation.

External	Opportunities	Threats
	• Policy measures that are geared towards internationalisation can also be used to stimulate innovation if innovative SMEs are targeted and (export promotion) instruments are adapted (esp. paying more attention to customisation). • Existing policy measures that support research collaboration are a good starting point for SMEs to build international networks (provided that the development of these networks is carefully management). • Global expansion of academic researcher community (esp. outside Europe) to continue. • Rise of Open Innovation facilitates access of SMEs to global innovation networks from MNCs.	• Increasing reliance of some Member States' national innovation systems on EU funding due to slow growth of public expenditure on R&D (BERD) in Europe. • Emergence of China as a global scientific force (assuming that Chinese firms can exploit this force much better than their European counterparts), with an abundance of cheap high-skilled labour. As a result, R&D might be delocalized from Europe to China. • Expansion of Chinese firms into higher value services (e.g., internet services) and manufacturing (e.g., telecom hardware and sustainable technologies) could squeeze out European firms. Subsequently this might lead to an increase in tensions over trade and investment relations.

Strengths

In general, there is a **broad range of policy measures** in support of internationalisation of SMEs covering the various types of international activities of firms as identified in section 4.1. In addition, the policy instruments are accessible for all SMEs.

Despite the lack of (comparable) evaluation studies on each individual policy measure, meta-research (see e.g. Patel, 2012) shows that in general these policy measures have a positive effect on the likelihood of firms to cooperate with partners in other (European) countries, and thus **boosting knowledge flows** through **cooperation and innovation**. They do not only allow firms to have a (first) experience with cooperation, but these policy measures also increase the likelihood of the continuation of collaborations over time. Especially while more complex strategic alliances are risky to set up, public support programmes for collaborative R&D projects offer an important opportunity. This is especially the case for SMEs that would not have entered into a cooperation agreement otherwise. Indeed, in our case studies we found that SMEs value policy measures like **network activities** and **collaborative research projects** co-funded by the European Commission (formerly FP7 and now H2020).

Weaknesses

Most of the policy instruments supporting and/or coordinating internationalisation activities (e.g. EEN, EBO, ICI+) that we found are exclusively **focused on export and trade promotion**. There are only a few policy measures aimed at stimulating international production (e.g., some Partnership Instruments) and even less that aim at stimulating internationalisation of innovation of SMEs (e.g., EBTC and ELAN within ICI+, some Partnership instruments). In terms of budget, the imbalance is even greater. Hence, unless they focus on customization and/or specifically target innovative SMEs, most of the policy instruments seem to be of **less relevance** to the particular objective of innovation.

Exhibit 4-8: Number of policy instruments focusing on internationalisation of innovation of SMEs per EU programme

*** = strong orientation ** = some orientation * = weak orientation

EU programmes	*	**	***
COSME	4		
ICI and ICI+			2
Partnership instrument	2	5	
European Neighbourhood Instrument	1		
Horizon 2020			(1)

For the instruments to be effective, the intended outcomes should be connected to the beneficiaries. This means that the instruments should fit the characteristics of the specific target groups at hand. SMEs may need to possess at least some innovation capabilities ('absorption capacity') in order to benefit from an innovation-oriented support scheme. The threshold level of absorptive capacity is usually lower for national policy measures. Although many (innovative) SMEs make use of national programmes, they are struggling (rightly or wrongly) with the **complexity** of EU programmes. As a result, many national agencies set up specific programmes to support SMEs when they want to join EU programmes. Alas, since national and EU policy measures are (to a certain extent) not aligned, SMEs often keep focussing on national programmes, even if EU policy measures would suit their needs better.

Note that this 'absorptive capacity' also refers to the previous international experience from the SME entrepreneurs. Having international experience is an important precursor for subsequent international activities. For instance, many so-called 'born global' firms are founded by entrepreneurs that already have international experience (e.g., in their previous job at a multinational corporation).

The elements of personal experience (and 'attitude') related to the importance that is being given in recent innovation literature on the strong interrelatedness between a company's innovation milieu and human resource management and policies for attracting and retaining talent (Meissner & Kotsemir, 2016). Although the dimension of social networking – an acknowledged strength of the current portfolio of instruments – touches upon the cultural dimension, **human resource management** still seems to be underexposed. This is a weakness.

Another important issue is that innovation routines and innovation networks greatly differ between industry sectors (Lui et al, 2013) and between firms of different sizes (e.g., micro firms versus bigger SMEs). Hence, in order for trajectory [2] (to move from trade and export to research and innovation abroad) , or trajectory [2] (from production abroad to research and innovation) to be viable pathways towards internationalisation of innovation, support measures should not only be **adapted to the specific needs** of innovative SMEs but even be more targeted. For instance, they

should be targeted to specific subsets of innovative SMEs.[90] However most policy instruments that are aimed at internationalisation are generic instruments and do not (yet) have this specific focus.

Thirdly, while it is a strength that the current mix of policy measures covers the various types of international activities of firms it is a weakness that the portfolio of instruments is rather **fragmented.** They often focus on either trajectory [1] (export promotion), trajectory [2] (production, e.g., FDI) or trajectory [3] (e.g., research collaboration). It seems more effective to design policy support measures aimed at internationalisation and innovation in conjunction. Yet this does require careful coordination at the EU level across various DGs and agencies. Such coordination is currently lacking.

Having said this, as already described in section 4.3.1 there is no clear empirical linkage between the internationalisation of the three types of business activities. Export and trade does not automatically evolve into production abroad, and production abroad does not naturally evolve into doing innovation activities abroad. Hence the **strong focus on export and trade** in the current portfolio seems to be a weakness rather than a strength as it does not indirectly promote innovation – unless customisation is the focus and/or specific sets of innovative firms are targeted – but as stated earlier these elements are largely lacking in the existing internationalisation support measures for trajectory [1] and [2]. The other way around though – stimulating internationalisation by (deepening or extending) research and innovation – trajectory [3] – seems to work better. Hence if the objective is to internationalise the innovation activities of SMEs it is a strength that the *prime* focus of Horizon 2020 remains on R&D and innovation, not on internationalisation per se.

Opportunities

Despite the apparent strengths there are still a lot of opportunities to improve the current portfolio of policy instruments. Policy instruments that are geared towards internationalisation (trajectories [1] and [2]) can potentially also be used to stimulate innovation, and policy measures that are geared towards research and innovation can be explicitly aimed at internationalisation as well (trajectory [3]). The **coordination** between these two strands can also be improved. For example, in calls for research projects, more attention could be placed on customisation.

A large part of the current portfolio of support measures is exclusively focused on export and trade promotion. These measures could also be used to stimulate innovation if parts of the programmes were **specifically targeted to innovative SMEs** that do not operate outside the EU. These target groups could be rather precisely defined (e.g., research intensive SMEs that operate in the same industry, share the same knowledge base or work in the same technology field). Such SMEs are logically found in existing research and innovation programmes. Hence the targeting of such SMEs requires careful horizontal coordination (e.g., between DG Enterprise and DG R&I). There is still ample room for improvement regarding the coordination of the different policy measures that aim at trade promotion (I), internationalisation of production (II) and research and innovation (III) respectively.[91]

Targeting alone will not be sufficient to render generic export promotion measures suitable for innovative firms. The instruments should also be adapted to the specific needs of the new target groups. **Innovation-oriented trade missions** for instance should be focused on **earlier stages of product development** (rather than on the later commercialisation phases). They should target

[90] As commented by one of the respondents to the online survey (see Selhofer 2016): "[the] opportunities and requirements for international innovation depend very much on the specific case: the sector, the structure of the supply change etceteras."

[91] This was also an important recommendation in the study of EIM (2011) on opportunities for the internationalisation of European SMEs.

potential partners for RDI collaboration (e.g., co-participants in international research projects) rather than customers. And they should be aimed at a certain sector or (emerging) technology rather than a specific country.[92] The national best practice from Spain (Business Cooperation for International Innovation) and Germany (Netzwerk Hessen-China) are examples from an internationalisation support measure hwere the two strands of internationalisation of research and innovation have been successfully integrated from the start.

An important element in the adaptation of generic export promotion measures to innovative SMEs is **customisation**. For the innovative SMEs that made up our case studies, customisation is the most important internationalisation activity with regard to trade and export. However, customisation will usually not be covered by export promotion schemes because it is aimed more at innovation (customisation is innovation with the particular intention to gain access to a foreign market) and less at internationalisation (customisation does not necessarily involve a foreign partner). Next to targeting (specific groups of) innovative SMEs, another opportunity for improving existing internationalisation support schemes would then be to introduce the issue of customisation.

Another element that could be added is the **purchasing or licencing of internationally developed intellectual property (IP).** In-house knowledge is the important asset for most of the innovative SMEs. As such they will be very wary to expose the knowledge to (potential) competitors. In several of our case studies, this was mentioned as an obstacle to internationalising innovation activities. Firms prefer to keep their research and innovation activities at home. The reluctance to internationalise innovation activities might partly be due to the unfamiliarity of SMEs with IPR.[93] Interview partners indicate that knowledge about the topic is not always available within SMEs. As such they might overrate the risks of internationalising their research and innovation activities. SMEs could, of course, hire consultants and legal experts. Indeed, it seems that intermediaries play a small but important role in knowledge markets, also internationally (OECD 2013). However, in Europe this market seems to be less developed. There is already an existing policy measure that specifically aims at providing advice for SMEs on IPR – the IPR Helpdesks. The support of the Helpdesks could be provided in specific strands within innovation-oriented export promotion support measures.

With regard to trajectory [3], it seems that existing policy measures that support **research collaboration** seem to be a good starting point for innovative SMEs to build international networks. Although these support measures are primarily aimed at research and innovation, in the schemes, innovative SMEs collaborate with larger partners (national universities, public research organisations and large firms) that often are already considerably internationally oriented. SMEs could use the networks of their partners to secure access to countries outside Europe.[94] Note that SMEs which spring up from such networks (e.g., university spin-offs like Numeca, poLight or WEPROG or spin-offs from high-tech MNCs like KeyGene) are in a sense "born global" or at least strongly internationally oriented from the start. The global academic community also continues to grow at an ever increasing pace, and the fastest growth is outside Europe. At the same time, due to the rise of open innovation, multinational corporations are increasingly willing to open up their global research and innovation networks. In this respect, trajectory [3] might just be the most natural pathway for the internationalisation of innovation.

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[92] Most of the Partnership instruments do have this focus on particular technologies but that are still predominantly geared towards export and sales, not so much towards research and innovation collaboration.

[93] The importance of IPR was played down by one of the respondents to the online survey who commented that the ability to negotiate and establish attractive agreements is more important than IPR (see Selhofer 2016).

[94] The national best practice from Norway is an example of a policy instrument that builds on the existence of such international networks.

This does, however, require a careful and **proactive management** of the emerging collaboration networks.[95] Due care should, for instance, be taken to the composition of consortia. One should strive for mixtures of various countries of origin (also outside the EU), types of research organisations and small and large firms. With regard to the latter, it should be said that international research projects are a very suitable nexus to link up SMEs with the global innovation networks from multinational companies. At the same time, one should be wary of in-crowds of large firms in individual research collaboration programmes.

Careful network management is also needed to get a natural transition for SMEs from smaller to bigger projects and consortia. SMEs should first gain experience in smaller projects before being introduced to larger consortia and larger partners. Only at the end of such a **phased development,** innovative SMEs could be admitted to consortia of large firms. Ideally, this 'internationalisation pathway' of trajectory [3] already starts at the national or even regional level. The provision of local support services is very important in preparing SMEs before they go abroad (EIM, 2011).[96] National (and regional) programmes targeted at firm-university interaction could be used a logical entrance to international research and innovation projects (e.g., H2020).

With regard to broader policy measures that improve the **preconditions for the internationalisation of innovation,** one opportunity seems to be to promote an **international orientation** among entrepreneurs. These measures are linked to the internationalisation activity of employment. The focus on human resources is also a hallmark of the latest generation of innovation models (Meissner & Kotsemir, 2016). Born global firms are, for example, founded by entrepreneurs that already have significant international experience themselves and extended international networks (Tanev, 2012). Additionally, in the study of te Velde, Veldkamp, & Janssen (2014), it is illustrated that path dependency is important: former personal international experiences of managers help firms to go abroad. The trend to put more emphasis on the **human resources** aspect closely aligns with the current emphasis on social networking in the EU RDI policy. Erasmus for Young Entrepreneurs is a good example that is directly aimed at this objective. The aforementioned participation of SMEs in international research collaboration also indirectly promotes an international orientation. For instance, the 'innovation milieux' of SMEs definitely becomes much more international once they have participated in EU research projects (e.g., H2020).[97]

Improving the overall business performance of SMEs is also a driver for internationalisation: SMEs that perform relatively well will generally be more outward looking than their local peers. The best performing SMEs are both more innovative and internationally oriented (EIM, 2010). Although it is difficult to distinguish between cause and effect (e.g, see Damijan, Kostevc, & Polanec, 2010), the causal direction improving the performance of a SME contributes to both objectives.[98] Thus, a generic policy that is neither export nor RDI oriented but aimed at the improvement of the performance of SMEs might eventually also indirectly contribute to the internationalisation of

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[95] This requires a careful monitoring of the evolution of social networks, along the lines of the network analysis of FP7 participation (European Commission, DG R&I, 2015b).

[96] The national best practice from Isreal (MATIMOP) is a good example of a network program that links local SMEs with other national firms that already operate on a global scale.

[97] The short-lived Connect Project within EBN was also an interesting example of an instrument that helped young European entrepreneurs to gain business experience outside Europe (that is, Brazil). Another interesting example is the national best practice from the Dutch Erasmus Centre (Get in the Ring). The national example from Sweden (Mobility for Growth) is specifically aimed at promoting transnational mobility, albeit only for researchers.

[98] In our online expert survey, over 80% of the respondents (fully) agreed that the more innovative a SME is, the more it benefits from going international. Respondents were somewhat less convinced (60% agreed) about the opposite relation, namely that the more international a SME operates, the more innovative it becomes.

innovation. Such policy measures can be effective because they have three effects on an SME: the firm grows; it is increasingly research-intensive; and it is more internationally oriented.

Business performance could, for instance, be stimulated by improving the competences of the management.[99] The dimension of **professionalisation** (e.g., with regard to managerial skills, human resource management, IPR or ICT) could also be integrated in existing R&D and innovation instruments.[100] With regard to the last dimension of ICT competences, the current fast growth of internet-based service platforms should be mentioned as an opportunity because these platforms greatly lower the entry barriers for international business activities. [101] They are, for instance, often thought to be instrumental to the rise of the much-hailed 'born global firms' (see before).

Threats

The vast part of private sector investments in R&D is being done by large (multinational) firms. For innovation, the distribution is somewhat less skewed but still many SMEs piggyback on the R&D efforts of MNCs to internationalise their own innovation efforts. Although the relative share of SMEs in RDI activities from MNCs might be growing (see previous paragraph) the **absolute volume of Research and esp. Development** from MNCs in the EU (and the US) is shrinking.[102] Overall, this leads to an increasing reliance from national systems of innovation from the Member States on EU funding. With specific reference to SMEs, the net effect of the two opposing trends remains to be seen.

A much clearer pattern is **the emergence of China as *the* global scientific force**, both in terms of R&D expenditure (with current growth rates it will surpass the US in the early 2020s), knowledge and technology intensive industries, and improved research output[103]. Although this development could also be regarded as an opportunity (namely chances to collaborate with Chinese

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[99] One of the participants to the concluding policy workshop made the general point that research startups often lack managerial experience. One particular reference was made to university spin-offs that lacked sales and marketing skills, could also in this particular case find these at domestic firms and eventually teamed up with (or were bought up by) foreign firms that did have the required (international) sales abilities.

[100] An interesting example of a scheme to foster professionalisation of (international oriented) SMEs are the webinar-based training programs from IMSME, the INSME Academy (http://www.insme.org/insmeacademy).

[101] This statement was to some extend supported by the answers from respondents to the online survey (see Selhofer 2016), albeit probably less strong than is expected: "digital economy facilitating access to information about foreign markets" was only recognized as a weak driver for conduction international RDI activities. Much more important as a driver was the need to expand markets in order to sustain or grow the business ("the national market is not big enough."). With a special reference to born global firms, the previous international experience from the SME entrepreneur seems to be a stronger driver than the availability of global digital platforms.

[102] This trend requires some further explanation. Although business R&D expenditure has started to rise gradually again in the EU after 2010 (in the aftermath of the financial crisis) one should distinguish between research (R) and development (D). Each of the two patterns of R&D globalisation is shaped by different sets of location drivers and has different implications. Large MNCs tend to concentrate their research in one or a few core labs, often supplemented by smaller centres, in order to gain access to interesting 'hotspots' in science and technology all over the world. Mature core labs are firmly embedded in and interconnected with their knowledge environments. They tend to be 'sticky' and costly to relocate. Development centres, on the other hand, are usually dispersed across all the various markets in which they operate (Deuten, 2015). Research investments in new innovation domains increasingly take place abroad, notably in Asia ('Refresh in the West, grow in the East'). Although the West is not in danger of losing their lead in research and technology immediately, its position could be eroded gradually (WRR, 2014).

[103] The proportion of Chinese articles among the most highly-cited ones has increased six fold between 2002 and 2012 (NSF 2014).

research partners) given the relatively closed nature of the Chinese research community (and infrastructure), it is more realistic to expect that the gain is much stronger for the Chinese firms.[104]

The Chinese labour market is currently flooded with highly educated young people. This situation might exacerbate social tension (which could also indirectly affect political relations with Member States and the EU) but at the same time, most likely wages will adjust to the new system of mass higher education and its quality will improve. If this situation occurs China will likely not only escape the 'middle-income trap' but will then also **expand into higher value services and manufacturing** and it will begin to squeeze OECD countries (as already happens in telecom hardware and renewable energy). Subsequently, this might lead to an increase in tensions over trade and investment relations.

With special reference to **internet services,** if the big US internet companies (that are currently dominating the global market) succeed in opening China's internet services market to foreign entry, Chinese companies will have to become more innovative and this could ultimately make them genuinely formidable global competitors. Europe will then not only face current strong US competitors but also newcomers from China.

As an overall result, **competition** by (high-tech) Chinese firms in local European markets might increase. Having said this, it is an empirical fact that some internationalisation of SMEs is exactly spurred because of the market entrance of such foreign competitors.

[104] The fact that there is now a surplus of engineers in China might be an opportunity. Firms and research organisations might be more willing to participate in partnerships with foreign firms than before. Especially for SMEs, the fact that there are now many highly skilled people on the Chinese job market might be an opportunity to lower their costs by off-shoring R&D, especially in 'second order' tasks (Lewin et al, 2009). In this study, the Kapro case is an good illustration of this pattern.

5 POLICY IMPLICATIONS

Governments should base the design of policy measures on empirical evidence, and the measures should be derived from concrete challenges which innovative SMEs face when they go international. The study team identified four principal challenges. First, innovative SMEs have to stay at the top end of international technological development ("Knowledge"). This is above all a driver to go international, but it is also a continuous challenge which innovative SMEs need to act upon and which policy makers can address. However, not every innovation activity is international, and not every international activity involves innovation (see section 4.1). The decision whether and how to internationalise a certain business process (sales, production or research and innovation) seems to be largely unrelated to the other business processes.

Research for this study revealed three principal challenges of going international: Establishing contacts to foreign countries ("Contacts"); Dealing with foreign cultures ("Culture"); Dealing with governmental policy, regulation in particular ("Policy"). Related specific challenges, how the SMEs deal with them, and possible policy measures following from them are elaborated in the following.

Notably, two usual suspects are not included: finance and skills. The SMEs examined in this study did not mention these issues as a particular challenge when internationalising innovation activities. This may partly be due to the selection of firms which are already active outside Europe, which is a peculiar and small subset of SMEs. Many innovative SMEs may well perceive constraints of finance and skills when going international or considering doing so.

1) Knowledge

The challenge: Innovative SMEs persistently need to stay at the forefront of international technological developments in order to stay competitive. This applies first of all to SMEs that provide R&D services such as Acreo and KeyGene but it also applies to innovative SMEs that sell technology-based products or services.

SMEs' dealing with the challenge: The SMEs examined in this study use specific ways to gain the knowledge and technological expertise they need. Several SMEs participated in international publicly funded R&D projects, notably through European Framework Programmes (e.g. Acreo, KeyGene, LifeTec, Numeca, Real Project Partner, Weprog) but also other European funding programmes (e.g. Intermet). Gaining new knowledge through hiring the best employees available also from foreign countries ("embodied knowledge") is another prominent way (Acreo, Fruit Freshly, KeyGene, Numeca, poLight). Some develop new knowledge while customising their services for foreign partners (LifeTec, Weprog). Others have informal networks or acquire intellectual property from foreign partners (Numeca) if need be. Spin-offs from universities or public research institutes (e.g. Numeca, poLight) or from multinational companies (e.g. KeyGene) may be in a particularly advantageous situation because they may be able to use their mother organisation's networks. The opportunities for SMEs to make use of such international networks are growing. The global academic community continues to grow, with the fastest growth outside Europe, and multinational corporations are increasingly opening up their global research and innovation networks.

Taking existing research and innovation policy programmes as a starting point (trajectory [3]) seems a natural pathway for the internationalisation of innovation. This does, however, require a careful and proactive management of the emerging collaboration networks. SMEs should give due care to the varied composition of consortia. They may be well advised to be wary of in-crowds of large firms in order to have their interests represented well. Careful network management may also be needed to naturally transit from smaller to bigger projects and consortia. Ideally, this internationalisation pathway of trajectory III already starts at the national or even regional level because the provision of local support services may be very important in preparing SMEs for going abroad. SMEs could use national and regional programmes targeted at firm-university interaction as an entrance to international research and innovation projects such as Horizon 2020.

Policy implications: The case studies do not suggest concrete necessities to modify policy measures in the field of developing technological knowledge in SMEs. The case studies draw a rather positive picture of the European Framework Programmes, and the SMEs use specific channels to gain the new knowledge they need. Notably, Framework Programmes work because they indirectly – this term stressed – foster the internationalisation of innovation of SMEs, namely by putting them into contact with research organisations that already have a global knowledge network. Hence "becoming more international" is a positive side effect of a policy that in first instance aims to make SMEs more research-intensive. However, the SWOT analysis suggests to simplify SMEs' participation in European programmes and to align national and European programmes because many SMEs perceive European programmes as too complex.

2) Contacts

The challenge: SMEs seeking to internationalise innovative activities need contacts in foreign countries in one or another way. They may need contacts for establishing subsidiaries for sales, production or research, for cooperating with sales, production or research partners, for acquiring intellectual property, for finding employees, or for finding customers. Only in case of digitised products or services which can be marketed and sold completely through the internet, no contacts in the target markets are necessary. The presence of global internet-based service platforms is often mentioned as the primary reason for the emergence of "born global" SMEs. However, the case studies do not provide an example for this. Even Ticketbis depends on contacts in target markets. This underscores the importance of contacts and international networks.

SMEs' dealing with the challenge: The case SMEs find and deepen their contacts in many different ways: through international R&D projects, informal networks built up through the careers of entrepreneurs, international conferences, international trade fairs, trade missions to foreign countries, national branches of multi-national enterprises, chambers of trade, and national embassies in foreign countries.

Policy implications: The case studies suggest that governments and governmental agencies can support finding international contacts in various ways. The indirect way is via Framework Programmes as mentioned. The direct way is through trade missions and local contact points in foreign countries, including national embassies, as well as using other export and trade support measures. However, the strong focus on export and trade in the European Commission's current portfolio of internationalisation support measures seems to be a weakness rather than a strength as it does not necessarily promote innovation – unless the measures target customisation. However, customisation will usually not be covered by export promotion schemes because it is aimed more to innovation (customisation implies innovation with the particular intention to gain access to a foreign market) and less to internationalisation (customisation does not necessarily involve a foreign partner). Consequently, export and trade measures could be adapted to the specific needs of innovative SMEs. For example, in trade missions: innovation-oriented trade missions could focus on earlier stages of product development rather than on the later commercialisation phases, target potential partners for R&D&I collaboration rather than customers, and be aimed at a certain sector or technology rather than a specific country. Related measures should consider that innovation routines and innovation networks greatly differ between industry sectors. Such measures could support SMEs that do already master international relationships as well as innovative SMEs that have not yet internationalised their business.

3) Culture

The challenge: Foreign cultures imply different norms, values, and behaviour which require additional resources on the part of the SMEs. According to the interviews with SME managers, Asian and also Middle-East culture often turns out to be particularly challenging. Communication with partners in foreign countries often takes longer than expected or desired. The particular relevance for SMEs is that they have much less "buffer" than big firms; hence they often cannot afford long delays. The case studies also suggest that having an international attitude is an important cultural trait and a precondition for success. Vice versa, hesitation to do business abroad

may partly be due to negative perceptions and expectations on the part of SMEs. Furthermore, reluctance to internationalise innovation activities may also be due to SMEs' unfamiliarity with intellectual property rights. Expert interviews for this study indicate that SMEs are not necessarily knowledgeable about this topic. Consequently they might overrate the risks of internationalising their research and innovation activities.

SMEs' dealing with the challenge: The case SMEs take things as they are. They seek communicating as professionally and cautiously as possible with foreign interlocutors because they normally do not have the power to influence the rules of the game and to speed up processes. Some seek advice from chambers of commerce, chambers of trade and embassies how to best engage with partners in a specific country. Entrepreneurs may typically first check their own personal networks for international contacts. There may be a strong path dependency: former personal international experiences of SME managers will be conducive to decide to go abroad.

Policy implications: The study does not find a particular need for newly designed governmental policy to help SMEs deal with foreign cultures. Dedicated governmental agencies and their helpdesks and portals may help SMEs making themselves familiar with foreign cultures and train related skills. However, few of the case SMEs (e.g. Ticketbis) reported having made use of such agencies. In a broader sense, policy measures could pay more attention to promoting an international orientation among entrepreneurs. This would combine the general trend to stress the importance of human resources and the emphasis on networking in the EU's research, development and innovation policy.

4) Policy

The challenge: Enterprises going abroad have to comply with legal norms which may differ from country to country, and regulation may impede business as such. Furthermore, one case SME (Weprog) reported governmental savings policies unfavourable for the specific field of business of that SME and also specific types of protectionism.

SMEs' dealing with the challenge: SMEs do not have the power to influence governmental regulations and other policies – they just have to accept them as they are and do business or leave business.

Policy implications: As regards regulations across Europe which are not yet harmonised, the European Commission can be recommended to further seek such harmonisation for specific markets. The secondary market for event tickets (Ticketbis) is an example encountered in the case studies. In other fields, regulations may need to be implemented more swiftly for providing a clear regulatory environment for doing business. An example from the case SMEs is KeyGene for agricultural biotechnology.

Overall recommendations

In general, the European Commission can be recommended to design policy support measures aimed at **internationalisation and innovation in conjunction** because research suggests that both are interrelated. Despite the apparent strengths, there are still a lot of opportunities to improve the current portfolio of policy instruments. Policy instruments that are geared towards internationalisation can also be used to stimulate innovation, and policy measures that are geared towards research and innovation can be aimed at internationalisation, too. The coordination between these two strands can also be improved. Finally, there are several generic policy instruments that can potentially improve the preconditions for internationalisation of innovation, e.g. with regard to human resources and entrepreneurship.

Furthermore, policy measures should consider that innovative SMEs have many different approaches to go international, depending on their business models and stage of development.

Hence the programmes should be designed in a way addressing this differentiation; **one size does not fit all**.[105]

Furthermore, considering a general lack of **evaluation studies** for assessing the effectiveness and efficiency of policy measures in the field of SMEs' internationalisation, political decision makers should invest more in such studies and assure that they are publicly available. This would enhance the evidence base for good policies.

[105] The participants of the expert workshop for validating findings from this study confirmed this finding.

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ANNEX 1: DETAILS ABOUT LITERATURE RESEARCH

The literature review for this study had two steps: First, checking relevant journals for related articles; second, searching for related journal articles, books and other publications in academic literature databases.

For the first step, the websites of four types of journals were reviewed for relevant articles: top-ranked entrepreneurship and small business journals, top-level management and marketing journals, public policy journals, and general journals. empirica conducted detailed search for related literature for the period 2011 – 2015 in order to identify the most recent and most relevant literature. Relevant journals were thoroughly searched for articles using the keywords "internationalisation", "innovation", "small business", and "SMEs". Abstracts of articles with at least one hit of these keywords were checked for actual relevance. The table below shows the articles scanned. Searches through specific economic journals did not return relevant results.

For the second step, a keyword search was conducted for relevant journal articles, books and other publications in academic literature databases such as EconLit, RePEc, AEAweb, Oxford Economic Paper series as well as general academic research using EBSCOhost.

Table: Scientific journals scanned for articles on internationalisation of innovation in SMEs

Entrepreneurship and small business journals	Management and marketing journals
1 Journal of Business Venturing	1 European Journal of Innovation Management
2 Entrepreneurship Theory & Practice	2 International Marketing Review
3 Small Business Economics	3 International Business Review
4 Journal of Small Business Management	4 Journal of International Business Studies
5 International Journal of Entrepreneurial Venturing	5 European Management Journal
6 Journal of Small Business and Entrepreneurship	6 Journal of World Business
7 International Journal of Entrepreneurship and Innovation Management	7 International Studies of Management & Organization
8 International Small Business Journal	8 International Journal of Management Cases
9 International Journal of Entrepreneurship	9 Canadian Journal of Administrative Sciences
10 Journal of Enterprising Culture	
11 Small Business and Enterprise Development	
Public policy journals	**General journals**
1 Cato	1 Harvard Business Review
2 Journal of Public Policy and Management	2 California Management Review
3 Research policy	3 Sloan Management Review
	4 Long Range Planning
	5 Growth and Change

ANNEX 2: CIS DATA ABOUT INTERNATIONAL INNOVATION

Types of co-operation partners

The types of co-operation partners include: A. Other enterprises within your enterprise group; B. Suppliers of equipment, materials, components, or software; C. Clients or customers from the private sector; D. Clients or customers from the public sector; E. Competitors or other enterprises in your sector; F. Consultants and commercial labs; G. Universities or other higher education institutions; H. Government, public or private research institutes. The questionnaire distinguishes between the following locations: Enterprise's location country, Other Europe (including EU and associated countries), United States, China or India, All other countries.

Small enterprises (10 – 49 employees)

No.	Country	Enterprises engaged in any type of innovation co-operation with a partner in China or India [%]	Enterprises engaged in any type of innovation co-operation with a partner in EU countries, EFTA or EU candidates countries (incl. national partner) [%]	Enterprises engaged in any type of innovation co-operation with a partner in all other countries except in EU countries, EFTA or EU candidates countries, United States, China or India [%]	Enterprises engaged in any type of innovation co-operation with a partner in United States [%]
1	Belgium	3,1	43,3	3,4	4,5
2	Bulgaria	0,7	13,1	1,3	1,5
3	Czech Republic	3,1	27,9	1,7	2,4
4	Denmark	2,9	33,6	3,7	4,7
5	Germany	0,5	18,2	0,7	0,7
6	Estonia	1,5	36,3	3,3	3,0
7	Ireland	2,8	25,1	3,0	8,0
8	Greece	3,0	33,7	3,5	4,2
9	Spain	0,4	23,2	1,1	0,9
10	France	1,3	28,6	2,2	2,7
11	Croatia	3,4	29,7	3,3	3,3
12	Italy	0,4	10,9	0,7	0,1
13	Cyprus	1,4	50,0	9,3	3,0
14	Latvia	2,6	19,4	6,1	3,6
15	Lithuania	4,9	37,5	3,5	7,1
16	Luxembourg	0	18,8	2,3	2,7
17	Hungary	1,2	33,1	1,5	2,0
18	Malta	1,1	13,3	0,6	0,6
19	Netherlands	3,2	30,2	2,3	8,6
20	Austria	2,7	37,6	2,2	5,3

21	Poland	0,5	19,4	0,7	0,8
22	Portugal	0,6	13,7	1,4	1,6
23	Romania	0	21,9	0	1,8
24	Slovenia	3,2	40,3	3,7	5,7
25	Slovakia	0,6	33,2	1,9	6,5
26	Finland	2,8	29,9	6,0	6,5
27	Sweden	:	26,6	:	8,2
28	United Kingdom	:	:	20,6	:
29	Norway	1,4	22,8	2,2	4,4
30	Serbia	0	16,8	2,9	0
31	Turkey	1,2	15,2	1,9	1,2

Base: Product and/or process innovative enterprises, regardless of organisational or marketing innovation (including enterprises with abandoned/suspended or on-going innovation activities) in "core industries" according to Commission Regulation N° 995/2012. This does e.g. not include the construction sector and not retail.

Source: Eurostat, Community Innovation Survey 2012

Medium-sized enterprises (50 – 249 employees)

No.	Country	Enterprises engaged in any type of innovation co-operation with a partner in China or India [%]	Enterprises engaged in any type of innovation co-operation with a partner in EU countries, EFTA or EU candidates countries (incl. national partner) [%]	Enterprises engaged in any type of innovation co-operation with a partner in all other countries except in EU countries, EFTA or EU candidates countries, United States, China or India [%]	Enterprises engaged in any type of innovation co-operation with a partner in United States [%]
1	Belgium	5,0	53,5	7,4	11,8
2	Bulgaria	1,7	16,5	2,9	3,7
3	Czech Republic	1,4	49,7	4,9	4,4
4	Denmark	7,3	46,9	9,7	11,9
5	Germany	1,6	30,8	1,9	2,4
6	Estonia	1,3	54,5	2,8	3,7
7	Ireland	4,9	31,6	3,7	13,0
8	Greece	5,4	52,4	5,4	10,7
9	Spain	1,5	37,9	2,5	2,7
10	France	3,2	41,9	4,6	6,4
11	Croatia	4,7	37,4	5,6	6,5

12	Italy	0,9	15,7	1,5	1,5
13	Cyprus	3,3	60,9	16,3	7,6
14	Latvia	5,6	32,5	9,4	7,7
15	Lithuania	2,5	51,2	7,9	4,2
16	Luxembourg	2,6	19,5	4,6	5,6
17	Hungary	2,8	47,3	3,5	4,4
18	Malta	2,7	18,7	2,7	4,0
19	Netherlands	8,1	35,0	4,5	13,0
20	Austria	3,1	47,4	4,5	7,3
21	Poland	2,1	36,7	4,0	4,1
22	Portugal	1,5	27,7	3,8	3,3
23	Romania	0,8	19,4	1,6	0,8
24	Slovenia	7,3	62,0	9,0	8,1
25	Slovakia	6,1	43,6	3,6	6,6
26	Finland	7,3	41,7	7,1	11,6
27	Sweden	8,3	34,8	8,3	14,0
28	United Kingdom	:	:	23,9	:
29	Norway	4,1	34,8	4,7	7,6
30	Serbia	0	18,7	1,4	0
31	Turkey	1,5	16,3	2,6	1,3

Base: Product and/or process innovative enterprises, regardless of organisational or marketing innovation (including enterprises with abandoned/suspended or on-going innovation activities) in "core industries" according to Commission Regulation N° 995/2012. This does e.g. not include the construction sector and not retail.

Source: Eurostat, Community Innovation Survey 2012

Large enterprises (> 249 employees)

No.	Country	Enterprises engaged in any type of innovation co-operation with a partner in China or India [%]	Enterprises engaged in any type of innovation co-operation with a partner in EU countries, EFTA or EU candidates countries (incl. national partner) [%]	Enterprises engaged in any type of innovation co-operation with a partner in all other countries except in EU countries, EFTA or EU candidates countries, United States, China or India [%]	Enterprises engaged in any type of innovation co-operation with a partner in United States [%]
	EU-28			11.8	
1	Belgium	13,2	69,0	11,6	26,8
2	Bulgaria	6,4	34,5	8,9	8,1

3	Czech Republic	8,6	59,9	9,3	12,5
4	Denmark	25,4	69,2	20,4	28,3
5	Germany	11,9	53,9	9,2	15,4
6	Estonia	3,6	70,0	14,5	10,1
7	Ireland	8,5	56,3	14,1	27,1
8	Greece	7,7	72,9	8,8	14,4
9	Spain	5,5	53,6	6,8	9,1
10	France	10,2	59,8	13,0	17,0
11	Croatia	4,9	59,6	11,5	12,6
12	Italy	5,0	39,4	5,0	8,9
13	Cyprus	4,8	66,7	28,6	19,0
14	Latvia	6,4	42,4	18,4	9,6
15	Lithuania	8,9	64,2	14,6	13,8
16	Luxembourg	19,4	38,7	16,1	19,4
17	Hungary	10,0	63,3	8,5	11,9
18	Malta	0	33,3	0	4,2
19	Netherlands	16,8	44,6	7,2	27,0
20	Austria	13,2	65,9	13,1	21,4
21	Poland	6,8	57,6	11,0	12,9
22	Portugal	8,2	60,3	13,7	14,3
23	Romania	4,9	39,1	7,9	7,1
24	Slovenia	12,7	72,9	13,4	17,1
25	Slovakia	8,1	47,1	10,5	8,1
26	Finland	21,1	71,9	18,7	31,8
27	Sweden	20,8	54,7	18,1	27,6
28	United Kingdom	:	:	30,6	:
29	Norway	8,5	54,3	11,2	18,1
30	Serbia	0	22,6	4,3	0
31	Turkey	5,3	37,2	8,0	8,1

Base: Product and/or process innovative enterprises, regardless of organisational or marketing innovation (including enterprises with abandoned/suspended or on-going innovation activities) in "core industries" according to Commission Regulation N° 995/2012. This does e.g. not include the construction sector and not retail.

Source: Eurostat, Community Innovation Survey 2012

Importance of certain strategies for reaching the enterprise's goals

The question was: "During 2010 to 2012, how important were each of the following strategies for reaching your enterprise's goals?" The following answer options were provided: Developing new markets within Europe; Developing new markets outside Europe; Reducing in-house costs of operation; Reducing costs of purchased materials, components or services; Introducing new or significantly improved goods or services; Intensifying or improving the marketing of goods or services; Increasing flexibility / responsiveness of your organisation; and Building alliances with other enterprises or institutions.

Small enterprises (10 – 49 employees)

No.	Country	Enterprises that consider developing new markets within Europe highly important	Enterprises that consider developing new markets within Europe not relevant	Enterprises that consider developing new markets outside Europe highly important	Enterprises that consider developing new markets outside Europe not relevant
1	Belgium	22,5	37,8	15,1	54,2
2	Bulgaria	21,5	39,1	13,2	47,5
3	Germany	18,4	42,1	10,3	59,2
4	Estonia	25,1	29,8	12,9	48,7
5	Greece	19,4	39,8	15,9	48,7
6	France	24,2	42,1	16,1	54,6
7	Croatia	24,5	39,2	12,8	53,3
8	Italy	19,2	47,3	17,0	57,6
9	Cyprus	16,3	73,5	17,1	77,6
10	Latvia	30,5	23,8	24,3	33,0
11	Lithuania	35,0	26,5	27,3	35,8
12	Hungary	44,3	17,4	16,8	30,7
13	Malta	21,1	46,4	17,1	49,3
14	Netherlands	28,7	26,5	15,1	46,3
15	Poland	20,0	43,2	12,6	57,3
16	Portugal	27,6	28,2	27,6	33,9
17	Romania	10,3	54,4	12,0	62,0
18	Slovenia	39,6	20,4	18,7	30,2
19	Slovakia	24,2	40,1	7,8	61,6
20	Sweden	7,9	41,6	8,9	50,0
21	Serbia	19,0	40,6	11,7	50,6
22	Turkey	14,6	54,7	17,3	51,7

Base: Base: Innovative enterprises (including enterprises with abandoned/suspended or on-going innovation activities) in "core industries" according to Commission Regulation N° 995/2012. This does e.g. not include the construction sector and not retail.

Source: Eurostat, Community Innovation Survey 2012

Medium-sized enterprises (50 – 249 employees)

No.	Country	Enterprises that consider developing new markets within Europe highly important	Enterprises that consider developing new markets within Europe not relevant	Enterprises that consider developing new markets outside Europe highly important	Enterprises that consider developing new markets outside Europe not relevant
1	Belgium	30,7	23,8	21,5	40,9
2	Bulgaria	31,3	28,3	22,2	35,6
3	Germany	23,8	27,9	20,5	42,2
4	Estonia	28,9	22,8	14,6	37,3
5	Greece	27,7	29,1	29,8	34,6
6	France	37,4	28,8	28,0	38,6
7	Croatia	35,0	30,3	21,9	39,2
8	Italy	26,9	29,6	33,1	34,5
9	Cyprus	23,0	60,2	18,6	72,6
10	Latvia	43,7	18,8	28,7	26,4
11	Lithuania	45,6	22,5	37,9	26,8
12	Hungary	49,9	19,0	26,6	29,0
13	Malta	30,4	39,1	22,8	47,8
14	Netherlands	32,2	22,3	24,7	35,6
15	Poland	27,1	32,3	14,7	46,9
16	Portugal	39,2	23,0	41,5	25,3
17	Romania	15,7	37,2	19,7	48,6
18	Slovenia	53,7	14,8	31,4	26,2
19	Slovakia	25,8	25,9	12,2	49,3
20	Sweden	14,1	30,5	12,6	40,5
21	Serbia	28,1	32,1	17,3	47,2
22	Turkey	25,3	38,5	28,8	35,2

Base: Innovative enterprises (including enterprises with abandoned/suspended or on-going innovation activities) in "core industries" according to Commission Regulation N° 995/2012. This does e.g. not include the construction sector and not retail.

Source: Eurostat, Community Innovation Survey 2012

Large enterprises (> 249 employees)

No.	Country	Enterprises that consider developing new markets within Europe highly important	Enterprises that consider developing new markets within Europe not relevant	Enterprises that consider developing new markets outside Europe highly important	Enterprises that consider developing new markets outside Europe not relevant
1	Belgium	32,1	26,1	31,3	33,5
2	Bulgaria	36,2	31,3	30,9	40,1
3	Germany	25,1	29,6	34,0	34,9
4	Estonia	34,1	27,6	29,0	35,3
5	Greece	31,4	21,1	34,8	27,9
6	France	40,6	25,8	35,4	36,0
7	Croatia	41,5	26,6	26,6	33,8
8	Italy	21,4	33,4	33,6	36,8
9	Cyprus	21,7	52,2	21,7	56,5
10	Latvia	28,3	34,6	25,4	33,5
11	Lithuania	46,8	23,4	42,4	25,3
12	Hungary	47,2	20,6	32,4	28,6
13	Malta	34,6	30,8	38,5	30,8
14	Netherlands	25,4	34,3	21,3	46,5
15	Poland	31,0	25,7	22,3	36,6
16	Portugal	36,7	22,7	47,7	25,0
17	Romania	9,2	26,3	14,6	32,6
18	Slovenia	58,6	12,2	39,1	24,1
19	Slovakia	35,0	24,4	23,6	32,9
20	Sweden	15,5	30,1	19,3	38,6
21	Serbia	28,7	34,0	17,0	46,5
22	Turkey	35,5	28,8	39,1	27,5

Base: Innovative enterprises (including enterprises with abandoned/suspended or on-going innovation activities) in "core industries" according to Commission Regulation N° 995/2012. This does e.g. not include the construction sector and not retail.

Source: Eurostat, Community Innovation Survey 2012

ANNEX 3: EXPERT INTERVIEWS AND QUESTIONNAIRE

Purpose and scope

The study team collected advice about internationalisation of SMEs' innovation activities from five experts. Three of them were interviewed for Chapters 2 and 3 of the report (background, case study analysis) and two for Chapter 4 (policy analysis).

Approach for interviews for Chapters 2 and 3

The experts interviewed for Chapter 3 include a representative from an SME association, from academic research and from public policy. The interlocutors are nationally or internationally renowned experts in SMEs and innovation policy. A member of the consortium interviewed the experts by telephone or video-conference. The interviews lasted between 25 and 60 minutes. They were carried out as semi-structured interviews, supported by an interview guideline. The interviews thus allowed for focused, conversational, two-way communication. The following interviews were conducted:

- Kumardev Chatterjee, Founder and President, European Young Innovators Forum (Brussels, Belgium): 9 September 2015.
- Antonella Zucchella, Full Professor of Marketing and of International Entrepreneurship, Faculty of Economics, University of Pavia (Pavia, Italy): 27 October 2015
- Jukka Häyrynen, Executive Director, Start-up Companies, Tekes – Finnish Funding Agency for Technology and Innovation (Helsinki, Finland): 22 December 2015.

Interviewees for Chapter 4

The study team interviewed the following experts for the analysis of policy measures:

- Prof. Christina Chaminade, Centre for Innovation, Research and Competence in the Learning Economy (CIRCLE), Lund University (Lund, Sweden).
- Christin Pfeiffer, Association Secretary General, International Network for Small and Medium Sized Enterprises (INSME).

Questionnaire for interviews with experts

Interview No.:	
Interviewee name:	
Interviewee's professional position:	
Interview location:	Phone number:
Interview time:	

Introduction

Thank you very much for taking time for this interview! It may take up to 30 minutes, depending on how much you would like to tell.

This interview takes place in a study about internationalisation of innovation in small and medium-sized enterprises. empirica and dialogic carry out this study on behalf of the European Commission, Directorate-General Research and Innovation.

The purpose of this interview is learning about your opinions about internationalising innovation activities. Altogether the study team will interview about four experts.

We plan to use selected statements from the interviews in reports to the Commission. While the names are planned to be listed in an annex of the reports, it shall not be told which interviewee stated what – unless you explicitly agree.

Overarching issues

- In what way are you dealing with internationalisation of innovation in SMEs? (I.e. from what engagements do you draw your assessments?)
- Is your expertise related to SMEs from specific countries, from specific industries, or of specific age?

Internationalisation of innovation

Practice

⇨ *The European Commission distinguishes two types of internationalising innovation activities: First, co-operating with an international partner to conduct research and innovation activities; second, innovating with the intention to access to or better compete on a foreign market (without necessarily having a partner in the foreign market).*

⇨ *The European Commission is interested to learn about new ways of internationalising innovation activities, not so much about classical ways such as outsourcing R&D.*

⇨ *The study focuses on innovation activities in countries outside Europe.*

- What ways of internationalising innovation activities do you see in SMEs? Which ways are most prevalent?
- Do you see differences between SMEs in different industries? In different countries? In SMEs of different age?

- How important is such internationalisation for innovative SMEs? (Important for sustaining and expanding their business, i.e. competitiveness and growth.)

Trends

- Do you see a trend in European innovative SMEs to internationalise their innovation activities?
- Do you see a trend in innovative SMEs in other parts of the world to internationalise their innovation activities?
- Do you think European SMEs should engage more in internationalising their innovation activities?

Drivers and barriers

- What is driving SMEs to internationalising their innovation activities?
- Do SMEs target specific countries
- Do SMEs target specific types of partners?
- What are the barriers to internationalising innovation activities?

Support to internationalisation

- Do SMEs look for support from other organisations helping to find the right contacts?
- Do SMEs use public support measures for internationalising their innovation activities?
- What public support measures are there?
- How useful are these measures for establishing or developing international innovation activities?
- Should there be more or different support measures? If yes: What kind?
- Do you know particularly helpful support measures? If yes: Could these be transferred to other countries or industries?

Impact of internationalising innovation

- What impact do SMEs' international innovation activities have? (E.g. on competitive position, market shares, customer relationships, quality of products or services, reputation, number of employees, turnover.)
- Does the internationalisation practice have disadvantages?
- Do you know insightful examples of failures? If yes: What kind, why did they fail, and what lessons can be learned?

Conclusion

- Would you like to note anything else?

THANK YOU VERY MUCH FOR ALL THE INFORMATION YOU PROVIDED!

We will send a summary so that you can check whether our notes are correct.

ANNEX 4: QUESTIONNAIRE FOR CASE STUDIES

Questionnaire for interviews with SME representatives

Interviewee name:	
Professional position, company:	
Interview location:	
Interview time:	

Introduction

Thank you very much for taking time for this interview! It may take between 25 and 45 minutes, depending on how much you would like to tell.

This interview takes place in a study about internationalisation of innovation in small and medium-sized enterprises. empirica (Bonn) and dialogic (Utrecht) carry out this study on behalf of the European Commission, Directorate-General Research and Innovation.

The purpose of this interview is learning about your company's experiences with internationalising innovation activities. Altogether the study team interviews twelve SMEs.

We plan to use selected statements from the interviews in reports to the Commission. While the names are planned to be listed in an annex of the reports, it shall not be told which interviewee stated what – unless you explicitly agree.

Competitive background

► *The following questions may be important to understand the context in which the company internationalises its innovation activities. However, the case study may not be as detailed.*

(1) What are the company's **business objectives**?

(*For example: grow the company, enter new markets, or just sustain business as it is, ...*)

(2) What country **markets** does your company target?

(3) What are your company's main **customers**?

(4) What are your company's main **competitors**?

(5) What is the company's **market share**?

(6) What are the most important current **market developments**?

(This may for example relate to the business cycle, new entrants, new technologies.)

(7) How important is **innovation** in your field of business in general, i.e. introducing new products or services or new business processes or new inputs?

(8) How important is innovation specifically for your company?

(9) What are the company's recent innovation activities?

Internationalisation of innovation in the company

Practice

(10) When, in what way and why did your company begin to internationalise its activities?

(11) Do you customise your services for customers outside Europe?

(12) Do you have subsidiaries or partners outside Europe for introducing products or services?

(13) Did you licence technology from outside Europe?

(14) Did you hire innovation personnel from outside Europe?

(15) How important is such internationalisation for your company?

(16) What were the developments and milestones since starting the international engagement?

(17) Does your company currently change international activities?

(18) Does your company plan to modify international activities in the future?

Drivers and barriers

(19) What were your company's motivations for internationalising innovation activities?

(20) What were the reasons for selecting the targeted countries and partners?

(21) What were the barriers to internationalisation, and how did you overcome them?

Support to internationalisation

(22) How did your company establish and develop international links?

(23) Did other organisations help to find the right contacts?

(24) Did you use public support measures?

If yes:

(25) Which?

(26) How important were these measures for establishing or developing international activities?

(27) Would you use the measures again?

(28) Would you recommend other countries or regions to introduce the same measures?

Impact of internationalising innovation and lessons learned

(29) What impact did the international innovation activity have? For example on your market shares, customer relationships, product quality, reputation, number of employees, turnover?

(30) Does the internationalisation practice have disadvantages?

(31) Were there any failures? If yes: Which and why?

(32) What lessons can other smaller companies and policy makers learn from your experience?

Conclusion

(33) Would you like to note anything else?

THANK YOU VERY MUCH FOR ALL THE INFORMATION YOU PROVIDED!

We will send a draft case study to you so that you can check whether our notes are correct.

This study focuses on two subjects – innovation and internationalisation – which are deemed to be crucial for the European economy. The study has two main parts: (1) Twelve case studies of small and medium-sized enterprises (SMEs) with insightful international innovation practice and (2) an analysis of strengths, weaknesses, opportunities and threats (SWOT) of European policy measures seeking to enhance such internationalisation. The case studies show that there are many different combinations of types of internationalising innovation, and no dominant scheme. Reaching a sufficient number of customers was found to be the principal driver for internationalisation. The SWOT analysis suggests designing policy support measures aimed at innovation and internationalisation in conjunction.

Studies and reports

Publications Office