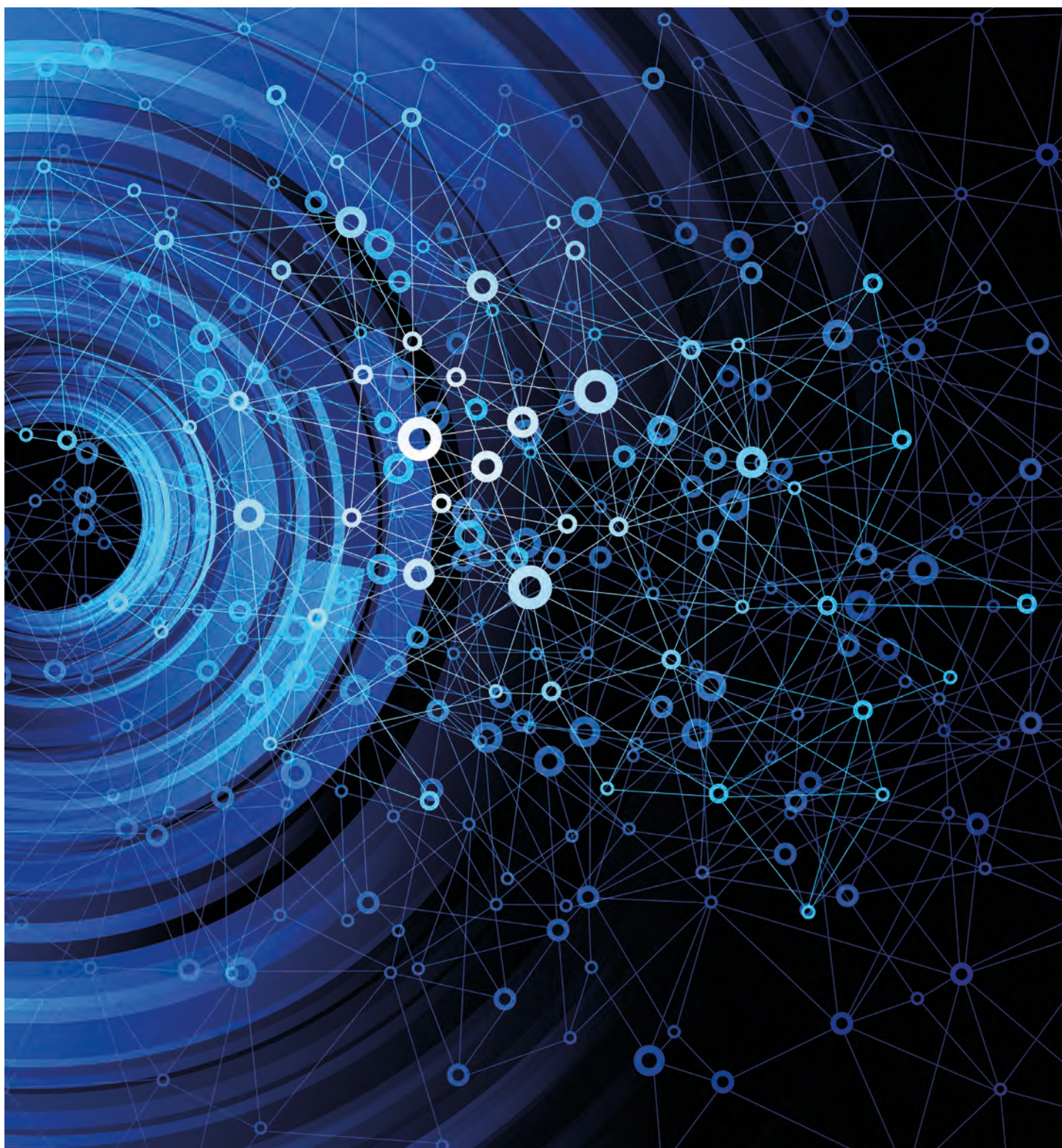


Expert networks used in technology strategy creation



Creating technology strategy with external expert input

Investing to drive company growth

To invest in a new technology area creates the opportunity for growth and the potential for significant competitive advantage but it also means a leap into the unknown. In these situations, gaining the input of external experts from different fields can bring new insights and generate future views on how technology will change, develop and disrupt in future and the ways in which the company can capitalise on this.

The value of independent, objective experts is most apparent when defining technology strategy, as they are free of the constraints of internal R&D activities and can identify new growth platforms for the organisation that are beyond the core knowledge of the company.

However external experts also bring challenges. How do you select those that offer the type of insights that would be valuable? How do you manage their input so that it is constructive? What will your internal experts think of these outsiders?

This paper aims to address these issues and share our learning points gained from many years of supporting open innovation, working with internationally respected authorities and facilitating their collaboration with multinational organisations.

Experts bring valuable new perspectives

- ★ Ideas from outside the organisation
- ★ External insights and challenges
- ★ Future views on how technologies will develop in the future
- ★ Opportunities to scout, research and integrate new technologies for growth
- ★ Ability to sanity-check technologies outside own sector and field of influence

Strategic technology management

Technology management relates to all of a firm's technology investment activities in products, services and processes and can be used to help define the competitive position and future direction. It should also encompass a review of external technologies that may complement or damage future market share.

To this end, the underpinning technology strategy may include recommendations for the acquisition of particular companies to gain access to their product pipelines or defensive IP strategies to stop competitors getting to market.

External experts provide an impartial view, not influenced by internal politics or cultural beliefs, and so provide an invaluable sounding board when defining strategy, identifying technology and growth platforms and developing roadmaps.

Technology impacts all functions within a business so its management must be defined and agreed at a senior level in an organisation. This is typically the remit of the Chief Technology Officer (CTO).

In many large multi-site operations there will be a distinction between high-level technology planning and the more localised R&D function. The R&D plan is a pragmatic document and examines the resources required to realise elements of the technology strategy in the near and mid-term.

The R&D Strategy and its plan fits beneath technology management and is the responsibility of the R&D Director.

Expert opinion provides a starting point

At the outset

The starting point for the technology strategy should be an assessment of the market need. Internal input from across the organisation is invaluable for this.

Engaging with marketing, operations and R&D at an early stage provides a base-line for assessment of the current and near-future situation and also achieves buy-in from key stakeholders into the development of the strategy.

However, to move an organisation beyond incremental improvement in existing products and processes, a 'big picture' view is required of the outside world and this is best achieved through contact with independent commentators, who will bring insights from well outside the company's industry sector.

This prevents recommendations from being myopic and self-justifying and can provide the confidence required to adopt radical innovation that will disrupt the business.

Innovation involves risk, and engaging with a multi-disciplinary team of experts avoids naïve assumptions based on insufficient knowledge.

Identifying disruptive technologies outside the sector

History has shown that industry sectors can be disrupted by technologies that have been developed and de-risked in other sectors. For example; the music industry had to change its business model to respond to the challenge of the download market, mobile phones have supplanted a multitude of single function devices such as MP3 players and low-value cameras and so on.

Currently the falling cost of 3D printing, biosensors, rapid prototyping and imaging technology are impacting many industries. But what are the disrupters of the future?

By developing a network that covers a broad spectrum of specialisms it is possible to identify where mature technologies from other sectors can be repurposed provide competitive advantage.

“We need to identify where fit-for-purpose technologies from other sectors are emerging in ours...”

Product Development Director, consumer goods sector

“External experts bring unexpected insights that can lead to ideas for new products or services and a future view on how innovation may disrupt in future. An external view carries more weight sometimes than an internal view and the value may be added by validation or further development of a known theme. The avoidance of naïve assumptions is another huge benefit.”

CTO for multinational, specialist chemicals and biotechnology products company

Gaining an external perspective

Recruiting an expert

Finding and engaging with these experts can be problematic as by definition they will be beyond your current community of contacts. There are several options here:

- ★ Train internal staff as technology scouts to identify external experts
- ★ Outsource to an innovation consultancy that has a multi-disciplinary team of experts in-house
- ★ Work collaboratively with a technology consultancy that has access to an international community of independent experts working at the forefront of their fields

The benefits of using independent world-class specialists

- ★ Add informed insights gained from current experience
- ★ Generate future views of innovation based on deep science knowledge
- ★ Bring knowledge and approaches from other sectors
- ★ Understand the underlying trends within an international context
- ★ Challenge internal assumptions on how technology will develop

Recruitment methodologies

Technology scout

Internal staff can be trained to become technology scouts and provide this service on an ongoing basis, keeping a watch on new technologies and trends and feeding back this intelligence to R&D and marketing.

However, an internal person often lacks the experience, objectivity and breadth required to support the development of technology strategy or technology roadmaps. They will be immersed in the culture of the firm and too aware of the potential internal obstacles to adoption of disruptive ideas.

Outsource to innovation consultant

Innovation consultancies provide an external perspective and provide an invaluable role in helping to implement the outcomes of the technology strategy. There is however a risk that the consultancies will use experts that are readily available from the pool of 'in-house consultants' as they are paying them a salary rather than selecting the best from an international world-class field.

Work collaboratively with international experts

Practitioners at nu Angle have experience of both of the above approaches. Having held senior positions in multinational organisations and worked as partners within large consultancies they are aware of how maximum value can be extracted from these approaches but also their limitations.

As a result, nu Angle has developed an alternative model. Over the last seven years it has created a global network of over 1,000 experts who are well respected by their peers and internationally renowned in their own disciplines. Additionally, these experts usually have access to communities of specialists in their niche field, offering a much wider and deeper perspective of a technology area than can be achieved in any other way.

Using its industry experience of the challenges facing CTOs and knowledge of the specific requirements of its client, nu Angle is able to bring together experts from outside the client's own industry sector and field of influence.

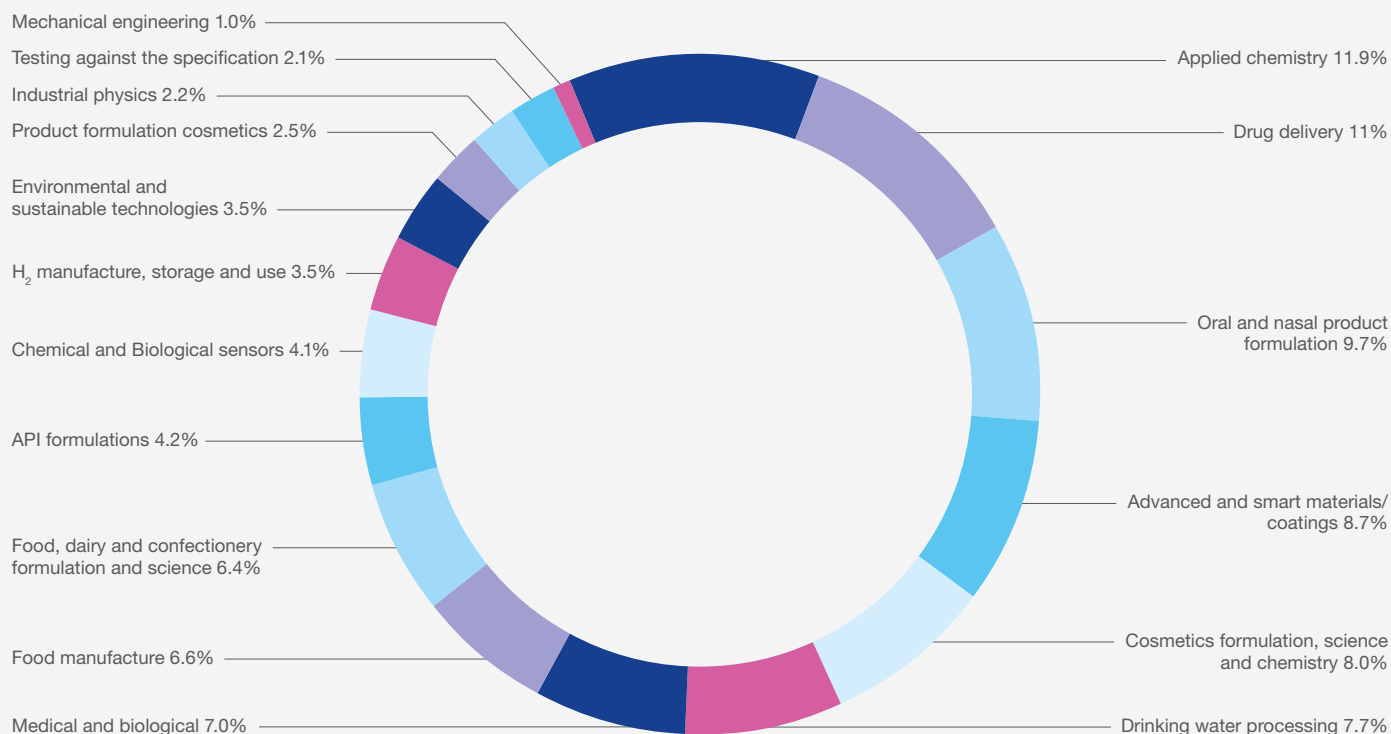
These experts are selected not just for their knowledge but also for their ability to communicate effectively with a commercial environment; for example, providing constructive contributions within a workshop environment.

“The greatest benefit of using a top tier expert was getting new insights into what may be possible from a deeper technical perspective. We came away with a greater level of confidence in the status of a particular technology, either understanding how doable it is or on the other side acknowledgement that some major hurdles exist and it is not going to happen anytime soon.”

CTO for multinational medical device manufacturer

The top one thousand experts in nu Angle's network

The Top 1,000 experts shown by the area of their main specialism



We have assessed over 1,000 experts drawn from a larger database generated over the last seven years. Over time some of these experts have become part of nu Angle's virtual team working alongside its associates. They add high quality thinking and knowledge of the latest developments to support the processes, tools and techniques developed by nu Angle to facilitate the development of technology strategies. nu Angle continually invests in managing and developing this ever growing group of experts.

Case Study

Cosmetics meets pharma experts



The project

Delivery of active ingredients deeper into the skin to provide more profound and longer lasting effects has been the goal of many cosmetics companies. This is challenging as the skin has been designed to keep out harmful chemicals.

Micro-encapsulation is widely used within pharmaceutical and 'over the counter' industries to transport active ingredients through hostile environments. It was thought that a similar process could be used for fragrances, sunscreens and active ingredients to deliver active ingredients (especially large macromolecules) into the deeper layer of skin and release the active ingredients at the site where it is most effective.

Greater understanding of encapsulation would take the personal care industry into new areas of application.

nu Angle brought together experts from the pharmaceutical sector with many years of experience of working on micro and nano-encapsulation technologies to provide insights into its application for cosmetics. The pharmaceutical industry is highly regulated so the technologies employed already pass the necessary safety standards and offer the opportunity for innovation in other industry sectors.

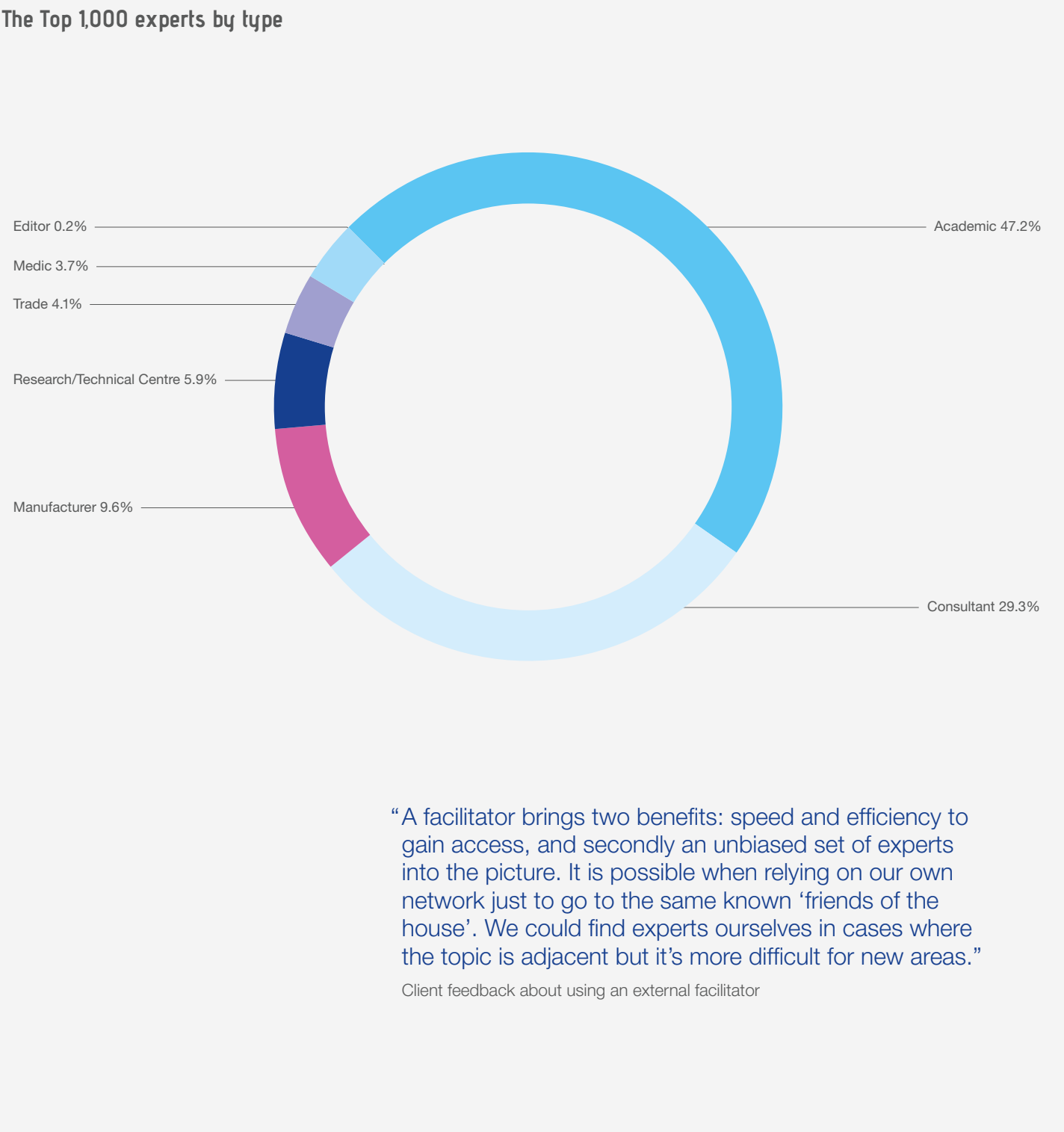
Outcome

The inclusion of pharma experts in the development of a technology strategy for the personal healthcare industry proved very useful in providing new solutions to difficult development problems and resulted in some new smart products.

Client feedback

"I think that the rich discussion and open collaboration amongst a team of experts has been most surprising and this is largely due to the environment that the nu Angle facilitator creates and manages through the process."

The selection of experts



“External facilitation is crucial as it keeps the team focused on the outcomes. The challenge that nu Angle provided was crucial. They also seemed to get up to speed very fast. We discussed this internally and we don’t know how they did that.”

Client feedback about using an external facilitator

Adding value

Experts can include academics but other useful specialists include: technology consultants, knowledge-transfer networks, regulators, non-government organisations, manufacturers and editors.

It is not sufficient that someone is a world-class expert in his or her field; the individual must also be able to participate effectively and contribute useful insight in a commercial setting.

nu Angle has found the best way to ensure this is to gain referrals and contact experts in person for an in-depth conversation.

Gaining insights

Insights from different sectors can provide radical solutions to intractable challenges, but companies find it difficult to access this information, as it requires engagement with experts outside their sphere of influence.

nu Angle has the ability to reframe the issue and locate experts within a ‘communities of practice’ that understand the science behind the problem.

nu Angle is able to immerse itself in these communities and tap into these inner circles. These discussions can unlock hidden insights from unexpected places.

By gaining a multi-disciplinary perspective it is then able to work with the client, to define an opportunity space for new product development or identify a novel growth platform.

Our learning points include

Select team players

It’s crucial to identify enthusiastic experts who will work in a team. Bios and CVs are not enough to gain an understanding of how an expert will interact with members of the client’s team and other experts in different disciplines.

Referral is crucial

Finding one expert who can nominate others helps enormously to ensure the credibility of the expert with their peers. nu Angle is able to leverage its international network of over 1,000 well-connected experts to access over ten times more.

Speed is important

Experts that are slow to communicate by e-mail and phone are going to be a serious problem.

Confidentiality is vital

This can be achieved using simple CDAs that can be signed quickly without massive legal intervention.

Research

Do desk research before talking to experts – knowing the key terms, trends and context gives credibility when talking to specialists in niche fields.

Identify ‘communities of practice’

One good expert always has his or her own network ‘communities of practice’ that share knowledge of mutual interests and work that isn’t part of the published literature. Desk based work is not enough to fully understand the technology space you need to talk to the right people.

“Choose experts carefully – they can have a big influence. Work out what you need to achieve and assess your capability in relation to achieving your goal. Identify any gaps in capability and leverage resources outside of your team/business unit/company/organization in order to achieve your goal.”

Client CTO for international confectionery brand

Working with experts

How to ensure you get the best results and the best value

To benefit from the insights offered by external experts, both the experts themselves and the in-house teams need to be fully briefed ahead of the workshop so that maximum benefit can be obtained from these sessions and the outcomes can be captured effectively.

nu Angle has found that the best value can be achieved by working on a one-to-one basis with the experts to extract relevant content that can be used as background briefing. It's always surprising how valuable it can be to have experiences, case studies and new technologies added by using experts from well outside the client's own sector.

The background briefing also creates a level playing field, so that discussion at the workshop can focus on extracting insights from between the experiences of the participants.

On the occasion where companies try to progress without first extracting the content from the experts, the workshop often gets too complex and overloaded with content and it usually fails to create the interaction between the participants that is so valuable.

Our learning points include

Collaboration

It is crucial to identify enthusiastic experts who work well within a team – it only takes one person to disrupt the dynamics of the session.

Mix

There needs to be a mix of very narrow specialist and also a polymath to cover all the bases. Many large consultancies find it difficult to employ the important narrow specialists and find them difficult to work with them if they are bought in from outside their cultures.

Ownership

Take care to ensure that the client owns any new ideas created in workshops. Careful legal construction of terms of business is important ahead of engagement.

Open-minded

Be open to suggestions that might at first sight look irrelevant, but on deeper research are very useful inputs.

Use of tools

There are a number of tools available to create virtual 'think tanks'; these asynchronous forums have a role in providing external challenge.

Timing

With new web-based conferencing it's possible to link different teams and communities of practice together wherever they are in the world. However, to get the most of these conferences make sure that they are carried out at sensible times for the experts – even if it means difficult times for the facilitator.

“Put internal resources into the project. The amount of information was massive and unexpected. It's taken us over a year to digest it and the results have been extremely positive.”

Client CTO for diary innovation company

The benefits for experts

Positive outcomes for all

Successful collaborations are those where everyone benefits from the experience.

The location of an expert becomes less important as communication technology improves. This allows access to a global community. Having experts in a project from different parts of the world also delivers different cultural perspectives and insights.

Experts bring with them a wealth of knowledge that is gained both from their own work but also attending conferences and personal contacts with their peers. Working closely with an industry client provides an opportunity for intellectual stimulus, new perspectives and better understanding of what industry needs from academia.

The expectations of the experts do need to be managed, as the timescales for decisions may be different.

Our learning points include

Profile

Experts can be found in a number of ways: through university websites, ResearchGate, Academia.edu, Google Scholar, their own web sites, membership of professional organisations.

Motivation of experts

Money is not a sufficient motivator; the best relationships are where the experts want to gain wider networking and opportunities for future consultancy.

“Intellectual stimulus was a key driver: it’s always great to be involved with an external organization to get a new perspective on business developments.”

Environmental engineering expert

“I saw it as an opportunity to present my expertise to a large biotech company.”

Therapeutic delivery specialist

“I found the format of the structured ‘brainstorming’ to be very useful and positive.”

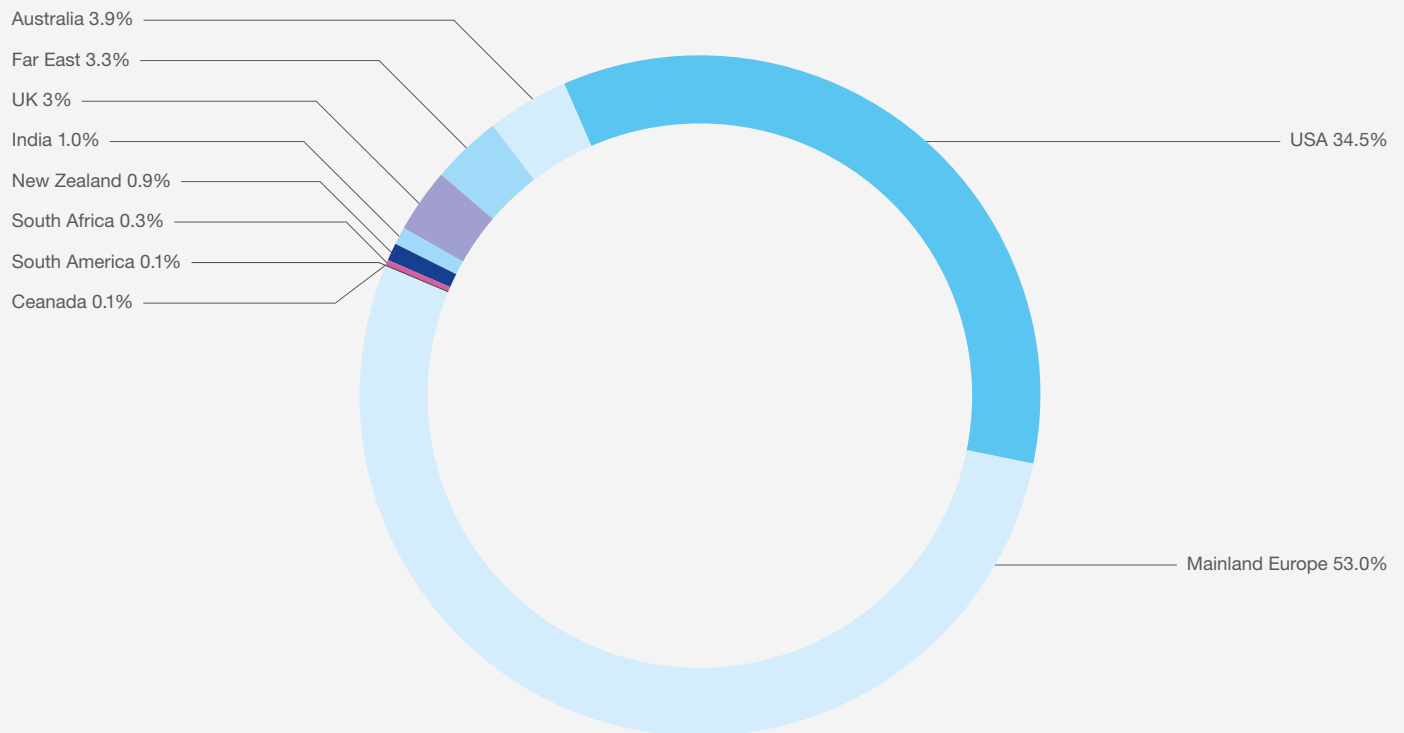
Water expert

“Having experts working on a project from different parts of the world delivers different cultural perspectives and unexpected insights. This is especially the case when they are brought together with our own R&D people.”

R&D Senior Executive Confectionary company

A truly global market

The Top 1,000 experts by location



“A very positive interaction. The new information inspired some new trains of thought. We included global experts in workshop sessions where they helped to challenge our assumptions.”

Director of global innovation for large biotechnology company

Case Study

Dairy meets ultrasonics



The project

Large amounts of energy are required for pasteurization in milk processing. An alternative technology is potentially the use of ultrasonics followed by nano filtration.

Nano filtration has been used successfully for many years for water purification and softening and it was thought this could be applied to applied to milk with modification.

nu Angle introduced its client in the dairy processing industry to experts in power ultrasound, a technology that is used in other industries for emulsification, homogenization, extraction, degassing, defoaming, particle size reduction and viscosity alteration.

The client brought a deep knowledge of milk, which is a delicate biological structure, and the discussion developed about how ultrasound would impact the product.

Insights were gained in the use of ultrasound to produce pressure waves in the milk which cause shear disruption, creation of microscopic bubbles in liquid foods (cavitation) and thinning and disruption of cell bacteria membranes.

Outcome

During a technology roadmap exercise experts from the other sectors were able to predict the emergence of more efficient ultrasonics to apply low temperature and low pressure technology to milk sterilisation.

Knowledge of in-line sensing of bacteria to ensure milk is safe also came from biosensors, remote IR sensing technology from other sectors.

Client feedback

“If you are looking for a fundamental technology based approach to product innovation this is the best way to start as it leads to a portfolio of opportunities from incremental to breakthrough but all linked back to technologies.”

Next steps in using expert networks

Overview

Whether it is to prioritise your technology investments, create future technology roadmaps or growth platforms it's very important to get the right experts input before any execution.

You don't need many experts, but enough to cover the potential landscape without missing important areas and to do this effectively requires time, breadth and knowledge of other industry sectors.

nu Angle has found that the optimum number is between 5 and 10 experts to join the internal team.

The internal team should be selected based on capability, experience and open mindedness. Before anything is done the experts will need to sign a confidential disclosure agreement (CDA) and terms of business. This protects your company and avoids leakage of any strategically important information.

The experts will also need payment for their time which, in the first instance will be 2-3 days each.

Six step plan to preparing a workshop

1.

Frame the questions internally with R&D/Marketing/Business Strategy staff.

2.

Find the right experts using desk research and personal referrals..

3.

Set up non-disclosure agreements, Terms of Business and any special working/communications protocols with the experts.

4.

Brief the experts personally and extract content to create background briefing documents to prepare participants for the workshop.

5.

Formulate structure for the workshop that will ensure effective participation from all experts. Assess outputs using specific tools and techniques.

6.

Outputs from the workshop can provide input into technology strategy development. Some of the experts involved in the workshop may also be used in the implementation.

Contact us

If you would like to discuss your requirements please contact Steve Bone on moreinfo@nu-angle.com

About us



About the author

Dr Steve Bone started his working life as an industrial chemist and materials scientist before becoming a business director for the sensor division of Thorn EMI.

For the last 25 years he has occupied leadership positions in leading technology, innovation and strategy consulting firms – namely PA Consulting Group, Arthur D Little and the Monitor Group – before forming nu Angle with Dr Peter Allen, a physicist with a similar background to Steve's.

Steve has helped clients grow their businesses through innovation and technology management in a wide range of sectors – chemicals, pharmaceuticals, consumer electronics, biotechnology, and fast moving consumer goods. He is also a recognised thought leader, having written papers on trends towards virtual R&D (before 'open innovation'), technology strategy and applying core competency thinking to R&D. He has worked on developing the approaches and thinking to technology strategy, growth platforms and technology business incubation whilst working at nu Angle and is now applying them to very successful assignments in Europe, USA and China.

About nu Angle

nu Angle helps clients capture real value from innovation. Since it was founded by Dr Steve Bone and Dr Peter Allen, nu Angle has established an enviable international reputation for excellence.

A core team of experienced consultants is supported by a virtual network of technology specialists. This offers the agility to create a bespoke team of industry experts for each client, reducing overheads and giving clients access to the insights of international experts. This includes access to relevant technology as part of an open innovation program.

It is the most experienced single group of technology and innovation management specialists in Europe, bringing together over 150 years of accumulated experience in helping clients grow through innovation.

nu Angle believes in creating lasting value. Its passion to share capability and transfer it to client teams means that clients continue to enjoy transformative success far beyond initial engagements.

nu Angle specializes in helping clients to:

- ★ Connect brand direction, ideas, and technology for sustainable innovation
- ★ Decide technology direction aligned with commercial priorities
- ★ Implement processes and systems that help deliver on choices
- ★ Create value from ideas and innovation.
- ★ Build client capability around technology
- ★ Innovation management

Services offered by nu Angle include the following

- ★ R&D strategy – analysis and design
- ★ Innovation and technology management
- ★ Innovation growth platforms
- ★ Technology road mapping
- ★ Innovation audit
- ★ Foresight and technology watch



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