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Contents

Page

Foreword

This document (CEN/TS 16555-5:2014) has been prepared by Technical Committee CEN/TC 389 "Innovation Management", the secretariat of which is held by AENOR.

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The CEN/TS 16555 series consists of the following parts with the general title *Innovation management*:

— *Part 1: Innovation Management System*;

— *Part 2: Strategic intelligence management*;

— *Part 3: Innovation thinking*;

— *Part 4: Intellectual property management*;

— *Part 5: Collaboration management*;

— *Part 6: Creativity management*;

— *Part 7: Innovation management assessment.*

Part 7 is in preparation.

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Introduction

Individuals and organizations would be hard pressed to possess all the skills and knowledge necessary to innovate regularly and effectively. Through collaboration it is possible to significantly improve the innovative performance of an organization.

This document describes the reasons to collaborate in different circumstances and the different ways in which organizations can collaborate, and it provides guidance for managing collaboration between individuals, teams and different organizations.

Issues addressed include when, how and with whom to collaborate, different types of collaboration and the difficulties and benefits of doing so. Case studies are included in Annex A to provide insight through the experience of others.

1 Scope

This Technical Specification provides guidance for the management of collaboration and productive interaction between individuals, departments, divisions and third party organizations engaged in innovation. It applies to all types of organization including manufacturing and services industries, voluntary organizations, governmental and social enterprise but with a particular focus on small and medium-sized enterprises (SMEs).

This document is one of six parts that support CEN/TS 16555-1 of the series, CEN/TS 16555.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TS 16555-1, *Innovation Management — Part 1: Innovation Management System*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TS 16555-1 and the following apply.

3.1
bilateral collaboration
collaboration where two partners are involved

3.2
consortium
association or combination of multiple partners engaging in a joint venture

3.3
internal collaboration
collaboration between different individuals or groups within the same organization

3.4
open innovation
using external as well as internal ideas, and internal and external paths to market, in order to innovate[1]

4 Collaboration

4.1 General

As described in CEN/TS 16555-1, collaboration is often an integral part of an innovation process and, in CEN/TS 16555-1:2013, 7.9 and 11.5 briefly describe collaboration management and how it is possible, through managed collaboration, to significantly improve the innovative performance of an organization. This document provides more detail.

4.2 Collaboration and its benefits

Collaboration can allow for the acquisition of new skills and resources. In addition it can bring different groups together, improve the opportunities for successful creativity and innovation, solve problems and help exploit external potential.

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[1] Henry Chesbrough, who is generally credited with inventing the paradigm, defines it as 'use of purposive inflows and outflows of knowledge to accelerate innovation'.

Collaboration can be internal as well as with external entities. Involving staff members and their representatives is important in order to ensure buy-in and to dispel apprehension. In several countries such broad involvements are mandatory and rooted in social partner agreements and national legislation. Teams from different parts of an organization (or from outside), perhaps from different countries or regions, or from diverse business functions, may collaborate to achieve a common goal – a new global product or service or a bid to a major customer.

Collaboration is an activity that pools skills and resources that the organization does not have itself and it does so at less cost and/or by sharing risk, to contribute to a shared goal. This may be a matter of needing more resource or specialist expertise in one or more areas. Collaboration may also bring increased credibility to one or more of the people involved in the collaboration. Innovation can arise from interactions among people with different skill sets and experiences, who either solve problems or generate ideas that create value. Collaboration is therefore of vital importance for increasing the potential for innovation.

Collaboration with universities and research institutes is recommended as one policy as this can bring a variety of benefits. First, market innovations originating in a research facility can be exploited and brought to market; second, a wide range of disciplines can be accessed to generate ideas for new products and services and finally, research may be able to provide specific expertise to resolve otherwise intractable problems.

Collaboration with other organizations, sometimes competitors, may take place to reduce costs, especially in areas of non-competition or in areas that the organization considers non-core, or to bring complementary expertise to the project.

4.3 Types of collaboration

The knowledge and technology necessary for innovation may lie partly or wholly outside an organization's traditional core competencies. A common policy for addressing this problem is to form alliances with other organizations and institutions. This can increase the circulation of tacit knowledge and allow an organization to acquire knowledge outside its boundaries. Consequently, these cooperative agreements for R&D have grown dramatically.

However, many organizations enter into these agreements without considering the appropriate form of collaboration. Figure 1 shows the different types of collaboration, expressing the wider scope as we proceed from purely internal to fully open innovation.
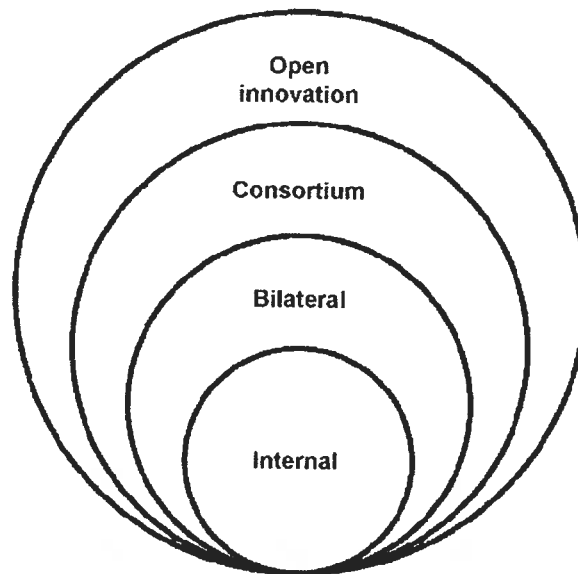
Figure 1 — Types of collaboration

a) **Internal collaboration:**

Collaboration can be within organizations as well as involving external partners. Internal collaboration has many challenges, including a tendency among groups, known as the 'not invented here' syndrome, to reject ideas and innovations that originated elsewhere. However, since the participants are from the same organization, they would tend to have some shared understanding, which is a necessary condition for successful collaboration. However, in many very large organizations, even this shared understanding is missing because of their sprawl and scope. Sharing information and communicating the organization's vision and mission widely to all staff members is crucial.

Many of the cultural barriers to collaboration are as prevalent within as between organizations. It has been suggested that information can flow more easily between, say, software developers from different companies meeting at a barbeque than between people from different departments within the same organization. Organizations therefore need to create a culture of sharing and, often, to overcome political resistance to working across silos.

Modern technologies have the potential to facilitate internal collaboration and also external collaboration across time, distance and cultures.

b) **Bilateral collaboration:**

Bilateral collaboration is a simpler version of the consortium where two partners are involved. Nonetheless, the same issues (see Clause 7) should be addressed.

c) **Consortium:**

A consortium is an association or combination of multiple partners. It is essential to agree in advance how the consortium will work, the ownership of intellectual property, etc. (see Clause 7).

d) **Open innovation:**

The central idea behind open innovation is that in a world of widely distributed knowledge, with the border between the organization and its environment becoming ever more permeable, organizations cannot afford to

rely entirely on their internal knowledge, but should instead look to complement it with external knowledge by, for example, buying, licensing or co-generating processes or inventions from or with other organizations. These are the 'inflows' in Figure 2. These can be used to better address the organization's current market or to extend its current boundaries and address new markets.

In addition, internal inventions not being used in an organization's business could be put to use through licensing, joint ventures, spinoffs, for example. This creates new markets for others, as shown in Figure 2. The IP policy should clearly state who will benefit from any income from licences or patents.
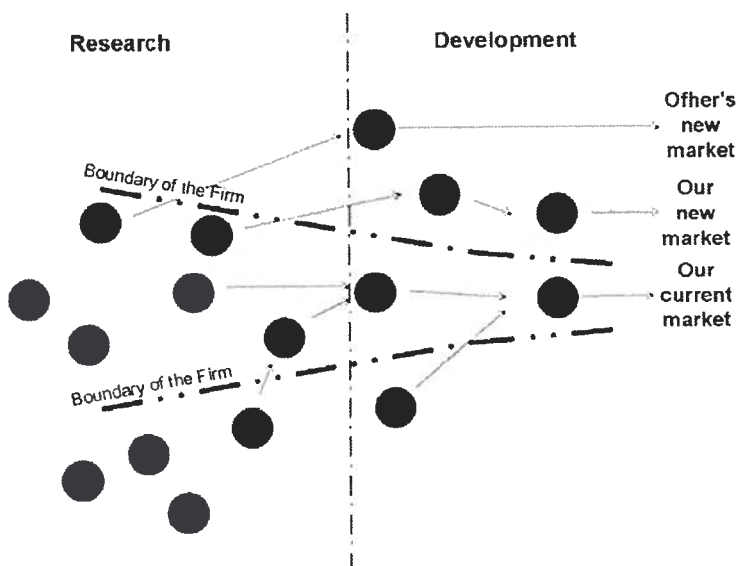
Figure 2 — Open innovation (after Henry Chesbrough)

5 Collaboration at different stages in the innovation process

Collaboration is integral to a wider on-going innovation management process (CEN/TS 16555-1). As such it should be embedded in the organization's policy, sanctioned and supported by the organization's leadership and accepted by staff and other stakeholders. The leaders should define the reasons for innovating and the scale of their ambition and be explicit in encouraging collaborative behaviour as part of the innovation process.

Collaboration can take place at many different phases of innovation (see Figure 3) and the type of partner can vary depending where one is in the process. For example, at the later stages the organization may not be looking for a new idea but instead need to find a solution to a specific technical problem, require access to manufacturing facilities or need marketing expertise – that is, looking for knowledge to solve a problem (which may be about producing a new product or service) rather than knowledge that prompts or generates an opportune innovation. All stages of the innovation process are important, not just idea generation, and collaboration can be appropriate throughout.

**Figure 3 — Schematic representation of the innovation management process (innovation funnel)
(CEN/TS 16555-1:2013, Figure 2)**

6 Management of collaboration
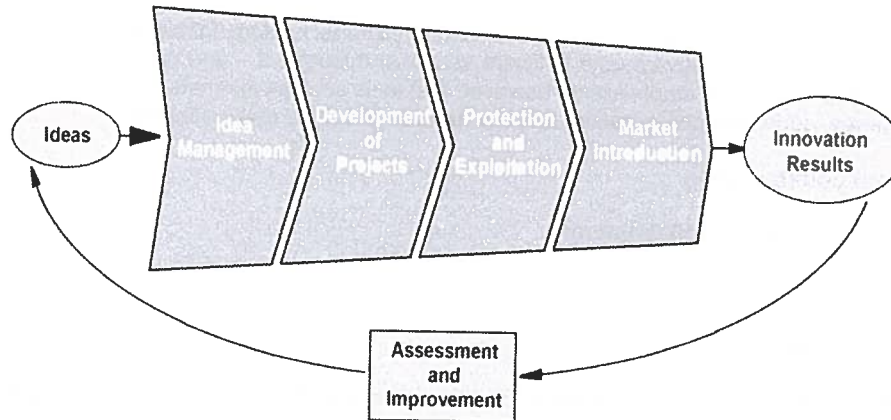
6.1 General

There are many issues to be dealt with if collaboration is to be successful or, indeed, if it is to happen at all. Although some of these are common to all forms of collaboration it is worth distinguishing between internal and external cooperation needs.

6.2 Internal collaboration

6.2.1 Culture

One of the major issues, for large and small companies alike, is that the culture may not encourage, or may actively discourage, collaboration. A culture change programme is then required in order to move from a situation often expressed as 'knowledge is power' to one where sharing knowledge is empowering. Open communications and the absence of a blame culture are crucial enablers of a culture of internal collaboration.

Culture change does not happen overnight and a sustained programme is required. It is essential to ensure that all inducements and sanctions are properly coordinated: for example, that reward and appraisal criteria do not contradict.

6.2.2 Management commitment

Without the sustained commitment of top management it is unlikely that a collaborative culture will evolve or be maintained. This commitment should be visible and not just in words: if leaders act in ways that are contrary to the behaviour that they say they want to encourage then no amount of corporate vision and mission statements – important as these are to a shared sense of purpose – will compensate.

Useful techniques include making innovation a regular agenda item for the leadership team and dedicating a minimum percentage of the organizational investment portfolio to innovation.

6.2.3 Resources

In order to encourage collaboration, the necessary time to do so and other resources such as training should be made available. These resources may vary, depending on the size of the organization and the physical (and cultural) distance between those taking part. See Clause 8 on encouraging collaboration.

It is important that dispersed organizations have a standardized technology infrastructure, if at all possible – that is, use the same basic software (and software versions) throughout – and provide ubiquitous access to the necessary tools. It is worth emphasizing, however, that tools such as intranets, discussion forums, etc. will not, of themselves, guarantee collaboration: that is a function of culture and leadership.

6.3 External collaboration

6.3.1 Criteria for external collaboration

Collaboration with external parties may be necessary because of:

— a lack of resources;

— a lack of skills or specialist expertise within the organization, perhaps within one or many specialist areas;

— the need to acquire some IP, for example from a university or research institute, or from another organization;

— the need to share costs and risk;

— the need to reduce costs or to bring complementary expertise to the project, which can often be done by sharing and collaboration with other organizations, even competitors, especially in areas of non-competition or in areas that the organization considers non-core.

6.3.2 Finding the right partners

The rationale for undertaking this collaboration in the first place should be understood. The organization needs to know exactly what it wants from the exercise and what it is prepared to give in return before embarking on a collaborative venture. A clear business case should be drawn up, the preparation of which is adequately described in general business literature.

The relevant partner(s) will then need to be found. These may be immediately obvious, perhaps uniquely having the expertise, skills or intellectual property required. More often, however, it will be necessary to find them. The best advice is to use existing contacts and recommendations.

Local universities and research institutes may have what is required and often have incubation and commercialization units to profit from research or expertise. State-sponsored development agencies are another source of contacts. Finally, there are several online search facilities.

A track record in collaboration is, of course, desirable.

6.3.3 The collaboration agreement

Any form of collaboration requires a clear agreement on the roles (who does what); responsibilities (for what each party will be held to account); liabilities (what money or other assets each party owes to the group); rights of the parties (what each party will receive from the collaboration) and on the management of the undertaking and any intellectual property involved (see 6.3.5)[2].

6.3.4 Governance

The collaboration agreement will typically describe the governance process. This may be more or less formal depending on the nature of the collaboration – for example, whether a legal entity is being set up that will employ staff – but it is essential that it is in place. Among the items that should be included are a goal and a schedule for achieving it. A resolution process for surfacing and resolving issues is essential, especially if the effort is being co-led by two or more people; this should include an escalation procedure.

It is also worth remembering that the brands (essentially the reputations) of the collaborators should not be endangered by the partners in collaboration. Collaborations bring risk as well as reward, in this and in other areas.

6.3.5 Intellectual property

The question of intellectual property (IP) is dealt with in detail in a separate document of the Innovation management series (see CEN/TS 16555-4). However, it is worth noting here that it is essential to understand the different aspects of IP and to agree on how it is to be accessed.

In brief, people who collaborate need to consider the treatment of the IP they bring to the collaboration, known as background IP; IP developed as part of the collaboration, called 'foreground IP'; and the access model to be used in exploiting them.

Background IP may or may not be required by the project. In any event, it is essential to ensure that the ownership of the IP brought to the collaboration is established. For example, participants may bring IP to which they have rights through licences but they may not have the right to grant access to this IP to the other parties. Indemnity against claims of misuse of IP should be included in any agreement.

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2) A number of useful models for collaboration agreements were developed during the European Commission's Framework Programmes. The latest versions of some of them can be found here:

— DESCA, Development of a Simplified Consortium Agreement, for Horizon 2020: http://www.desca-2020.eu/

— EUCAR, Model Consortium Agreement for Horizon 2020:
http://www.eucar.be/news-and-events/EUCAR%20Model%20Consortium%20Agreement

— MCARD-2020, DIGITALEUROPE Model Consortium Agreement for Horizon 2020:
http://www.digitaleurope.org/DocumentDownload.aspx?Command=Core_Download&EntryId=760

Further information on the establishment of Consortium Agreements and IP considerations, mostly related with Horizon 2020, can be found in:

— European Commission Guidance, 'Establishing a Consortium Agreement' (draft version 0.1):
http://ec.europa.eu/research/participants/data/ref/h2020/other/gm/h2020-guide-cons-a_en.pdf

— IPR Helpdesk: https://www.iprhelpdesk.eu/

— IPR Helpdesk, 'Your guide to IP in H2020 projects':
http://www.iprhelpdesk.eu/sites/default/files/documents/EU_IPR_Guide-to-IP-H2020.pdf

Above models have a much wider application; however, it is advised not to 'mix and match' from the different agreement models. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of these works.

Foreground IP may be developed solely by one party to the collaboration or be developed jointly. Again, it may or may not be required by the project but the ownership of the resultant IP should be established. Access and usage rights might specify duration (e.g. only for the duration of the project) and purpose (e.g. for research purposes only) and might be royalty-free to the partners, under licence, including open source documents, licence, etc.

More detailed information on IP management in collaborative environments can be found on CEN/TS 16555-4:2014, Annex E.

7 Collaboration between large and small organizations

7.1 General

Partnerships should provide mutual benefit to each participant, even when they are significantly different in size. Although, a very large disparity in size is often perceived as a potential obstacle to collaboration, the consortium in case-study in A.1 is an example of many different types and sizes of organization working successfully together. Cultural differences and speed of decision-making are two areas where problems can arise. However, there are a number of ways in which organizations can prepare themselves to work with others of a different size. Perhaps the most important activity for both parties is to create a partnership agreement, but there are different issues to which each side should pay attention.

7.2 Small organizations

A small organization can get access to resources, especially specialized ones, and have a greater market impact from partnering with a larger one. On the other hand, large organizations' processes can swamp a small one. Small organizations wishing to collaborate should:

— be confident and have belief in the proposition while remaining open minded;

— be prepared with a well-presented proposition and business plan which demonstrates how each party will benefit from the joint venture;

— establish expectations of reporting and governance;

— establish trust at an early stage: if the parties cannot work together in an open and trusting way then they should be prepared to walk away;

— have patience as large organizations need time before making large financial and resource commitments. However, reasonable time scales for decisions should be agreed, particularly if the answer is to be 'no', as this can then free the parties to find alternative partners;

— establish, even if there is a large disparity in size, if the partners who are collaborating share the same values, drive and shared objectives. If these are not present then difficulties may arise down the line;

— clearly identify and register intellectual property before approaching a potential collaboration partner (often large organizations demand this as a prerequisite).

7.3 Large organizations

For a large organization, a smaller partner can bring access to a specific technology, speed and flexibility. They can also have weaker governance, lack resources and be frustrated with the pace of decision-making in a larger organization. Larger organizations wishing to collaborate should:

— minimize bureaucracy and paperwork, which should be proportionate to the size of the project in hand;

— consider setting up a limited, project-specific team to reflect the size of the smaller collaboration partner;

— discuss partnering expectations;

— be fair and reasonable.

8 Encouraging collaboration

8.1 General

A lot of material has been written on this topic, and some pointers are given here, but research (see Bibliography Item [2], into Communities of Practice (CoP)) has indicated that the most statistically significant determinant of success is funding for 'face-to-face meetings'. The cost of setting these up should be built into the budget for innovation initiatives. The research further showed that ensuring community activities address business issues, that they have high levels of sponsor expectation, and community leaders are trained were also important. Furthermore, the cumulative effect of improving execution of these four factors would significantly increase (by approximately 1 point out of 5) the impact their CoP has on individual and organizational performance improvement.

Other factors that should be considered are:

— a top-level executive sponsor;

— ensuring that participation is seen as approved – even mandatory – behaviour;

— a shared sense of purpose;

— a clear link to business outcomes; and

— a reward – intrinsic or otherwise – for participation.

It is also necessary to provide staff with the tools to innovate through information access, training and further education.

8.2 Collaboration across time and distance

In an increasingly globalized world, collaboration needs to occur between individuals and teams separated by time and distance. Even if the organization is only collaborating locally, there may still be problems of distance and it may be difficult to co-locate teams.

High-speed internet, wireless connection and web-based collaboration tools, such as blogs and wikis, enable such collaboration at a very low cost. Social networking is becoming more available inside organizations. Tools such as instant messaging, team spaces, web sharing and audio conferencing should be exploited, if necessary, while web conferencing and internet protocol (IP) telephony services add an extra dimension. It is important to note, however, that tools do not make collaboration: they are enabling technology, supporting a specific goal of creating or sharing information or knowledge. Building a collaborative culture is a great challenge. However, it is generally held that most people, if asked, are only too happy to help and to contribute their knowledge and experience. Enabling these conversations should therefore be the function of supporting tools.

In many cases, especially in larger organizations, some or all of these technologies may be implemented and enterprise collaboration strategies are in place. In others, they are discouraged. In both cases, access to internet collaboration and social networking may be disabled or discouraged. Networks may be put under strain by many of these services, especially video, so they are often banned. Finally, giving partners access to internal resources may be difficult technically or culturally in that it could contravene the organization's code of conduct.
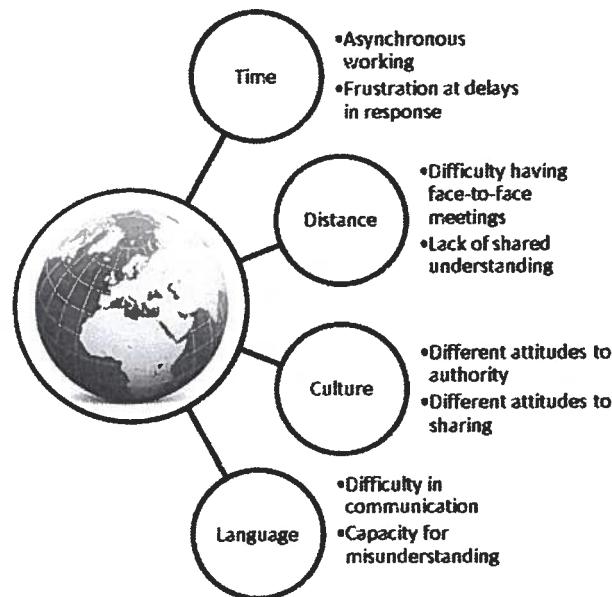
Figure 4 — Challenges of global collaboration

Enterprise collaboration tools include features such as staff networking, expert recommendations, information sharing, expertise location, peer feedback, and real-time collaboration. Collaboration encompasses both synchronous and asynchronous communication, the latter most useful when working over time zones.

Synchronous collaboration can be via web conferencing, IP telephony (sometimes called Voice over IP or VoIP), instant messaging, and rich video interaction with 'telepresence'. Asynchronous collaboration software is available from a wide variety of sources.

The temptation to start with the technology, however, should be resisted. Unless the 'softer', cultural aspects of encouraging communication and collaboration are addressed, investment in collaboration technologies may prove an expensive mistake.

In addition, new technologies that are more or less free spring up every week (and sometimes disappear almost as quickly). These can be used for telephone calls, conference calls, video calls, group video, screen sharing, instant messaging and file transfer.

So, although there is no shortage of tools, it is in general advisable to decide, in this order:

1) What business goal is the collaboration trying to support?

2) What knowledge (know-what and know-how) is required?

3) Who has it?

4) What process will be used to 'manage' it?

5) What technology is needed to support it?

Note that the choice of technology should come last.

Annex A
(informative)

Case studies

A.1 Case study 1 – An open innovation consortium

Institute A is a not-for-profit technology research and education institution, co-founded by a university and a major multinational corporation. It is an international consortium comprising senior IT managers and practitioners across various industries and government organizations, academia and professional services. In 2013, the consortium was composed of more than 90 organizations and is continuing to grow. Using principles of open-innovation collaboration, it researches, develops and disseminates empirically-proven and industry-validated examples to continuously improve the performance of IT organizations. These best-practice examples are captured in its management system, which is targeted at Chief Information Officers (CIOs) and senior IT decision-makers. It has been adopted in many US and European organizations, which are benefiting from significant improvements in how they manage IT to deliver value and enable innovation for their businesses.

A.2 Case study 2 – Bilateral collaboration

For over 35 years, Company A has produced high quality hi-fi components, starting with the amplifiers created by its founders while they were still at university and progressing through the CD boom of the 1980s and the home cinema revolution of the 1990s, to a new wave of products aiming to remove the 'experts only' tag from hi-fi and broaden the appeal of high-end audio.

Design has been central to this evolution. For the past 10 years, the business has worked closely with a top industrial designer. The MD describes it as one of their most important external relationships.

The designer has developed a new and enduring design language for its products, which were suffering in overseas markets because their appearance and materials did not reflect their true quality. Over the years the designer has been working closely with the company's engineers to reinvent how the company presents high-standard audio technology, making products more appealing to a wider customer base while sacrificing none of the sonic performance expected by the core audiophile market.

A.3 Case study 3 – A public-private partnership

This is a voluntary public-private sector partnership set up with the aim of generating a significantly higher rate of return on public spending to:

— create higher value jobs;

— provide a more competitive and attractive urban core;

— tackle climate change.

Unlike other such collaborations it does not have any delegated powers or budget but instead aligns money and policy across local government boundaries.

The main purpose of this collaborative partnership is to enable service delivery and local business and community interaction to be undertaken on a larger scale, unhindered by local authority boundaries. The challenge is to increase levels of personal prosperity, business success and population growth.

The collaboration has achieved notable success. For example when three individual members of the group were asked to bid against each other by a government department they instead came together and even invited the other partners to put in a joint bid. The bid was successful and responsible for 8,500 people across the region being helped into paid skilled work. The collaboration made significant financial savings and staff efficiencies across the group. This case is an example of how groups can leverage resources and know-how by coming together instead of highlighting their deficiencies by competing with each other.

Bibliography

[1]   *What is open innovation?* UC Berkeley, http://openinnovation.berkeley.edu/what_is_oi.html

[2]   KIN CoP Benchmarking Report ISBN 978-0-902610-81-3-3 (2006), Knowledge and Innovation Network, Warwick Business School

[3]   CEN/TS 16555-4, *Innovation management — Part 4: Intellectual property management*