LAND
BRANDENBURG

BRANDENBURG'S HEAVYWEIGHT

Master Plan
Cluster Metal Industry

THE GERMAN CAPITAL REGION

excellence in metal

LEGAL NOTES

Published by:	Clustermanagement Cluster Metall Brandenburg c/o ZAB ZukunftsAgentur Brandenburg GmbH (ZAB)
Translated by:	KERN AG, Sprachendienste
Edited by:	i-vector Innovationsmanagement GmbH
Picture credits:	Title: ZAB
Design:	Cover and illustrations 4, 5, 6 and 7: Bergmann & Partner Agentur für Werbung und Verkaufsförderung GmbH, ZAB
Date:	June 2014

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Brandenburg Cluster Metal Industry Master Plan at a Glance
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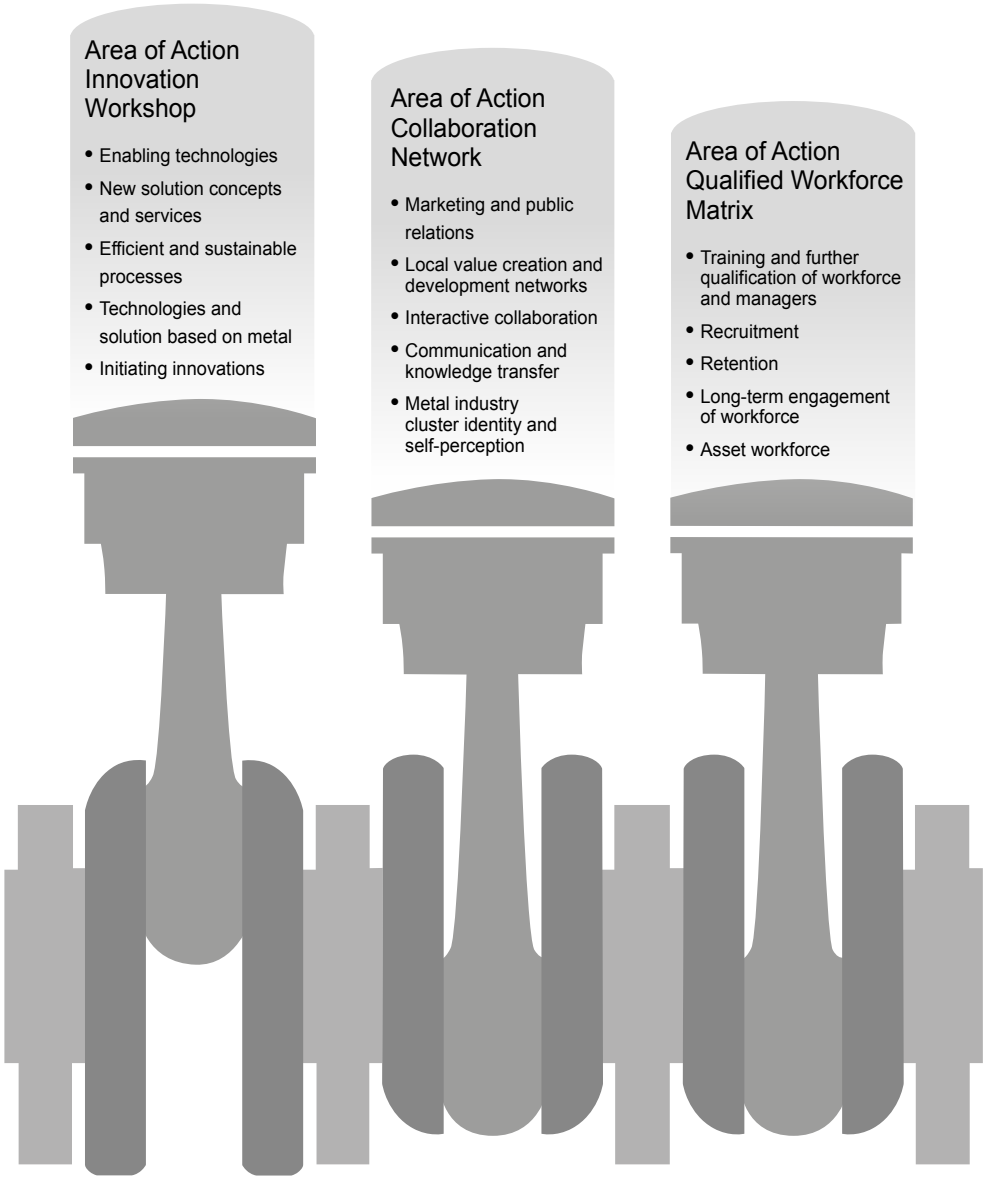

The Three Areas of Action in Detail – Cornerstones and Key Issues (KI)

Area of Action „Brandenburg Metal Industry Innovation Workshop“

Cornerstone Enabling Technologies

KI 01 Gaining and utilising materials technology knowledge
KI 02 Mastering manufacturing technologies and developing them further

Cornerstone New Solution Concepts and Services

KI 03 Light engineering based on material and manufacturing technologies as well as component and working concepts
KI 04 Product related services
KI 05 USP product design
KI 06 Digitalisation of design and factory planning processes
KI 07 Maintenance, repair and overhaul (MRO)

Cornerstone Efficient and Sustainable Processes

KI 08 Resource and energy efficient processes
KI 09 Materials efficiency, recycling and recovery
KI 10 Efficiency through the targeted use of modern component and process audits
KI 11 Flexible partial automation
KI 12 Automated production related end-to-end chain of information
KI 13 Quality assurance and quality management

Cornerstone Technologies and Solutions Based on Metal

KI 14 Technologies and solutions based on metal in currently existing industries
KI 15 Role of metal in new and emerging industries
KI 16 Sourcing, generation and transport of conventional energy carriers
KI 17 Role of metal in the production and storage of energy generated by alternative means
KI 18 Metal as an energy efficiency enabler
KI 19 Metal as a driver of sustainable transport
KI 20 Role of metal in mechatronics and electronics
KI 21 Role of metal in the recycling industry and in sustainable water management

Cornerstone Initiating Innovations

KI 22 Initiating innovations

Area of Action
„Brandenburg Metal Industry Collaborative Network“

Cornerstone Marketing and Public Relations
KI 23 Marketing and public relations

Cornerstone Local Value Creation and Development Networks
KI 24 Establishing competitive and flexible supply chains

Cornerstone Interactive Collaboration
KI 25 Cluster and region independent networks
KI 26 Efficient development and production collaboration

Cornerstone Communication and Knowledge Transfer
KI 27 Knowledge and technology transfer
KI 28 Commitment to efficient grant and subsidy management
KI 29 The Brandenburg metal industry and corporate social responsibility

Cornerstone Metal Industry Cluster Identity
KI 30 Perception and identity: „The metal industry, a key player in Brandenburg‘s economy“

Area of Action
„Brandenburg Metal Industry Qualified Workforce Matrix“

Cornerstone Training and Further Qualification of Industry Professionals and Managers
KI 31 Training and further qualification of workforce and managers

Cornerstone Recruitment
KI 32 Retaining, gaining and re-recruiting qualified professionals

Cornerstone Workforce Retention
KI 33 The role of further education in increasing the number of qualified industry professionals and managers
KI 34 Succession planning (management and employees)

Cornerstone Long-term Engagement of Workforce
KI 35 Green jobs
KI 36 Establishing the framework conditions for a working environment that is attractive in the long term - „good jobs“
KI 37 Workforce co-determination

Cornerstone Asset Worforce
KI 38 Asset workforce

Introduction

Metal industry pre-processing and processing companies are the backbone of Brandenburg‘s economy and a fundamental basis for related industry sectors such as mechanical as well as energy and vehicle engineering. The aerospace and the food industry also profit from a strong, future-oriented metal industry. This clear commitment to Brandenburg as a strategic industrial location is a prerequisite for a successful growth strategy. All stakeholders must become involved in this.

The Brandenburg Metal Cluster was established in 2012. It covers the industry sectors metal, electronics and mechanical engineering. In the following, the term „Metal Cluster“ is used to encompass all three. In this cluster, companies, science and research institutions, the master craftsmen guilds, industry associations, education providers, policy makers and business development agencies maintain very close links. The common goals are promoting the growth of Brandenburg‘s metal, electronics and mechanical engineering sector companies as they form the state‘s industrial backbone, and improving their competitiveness and their innovation capacity. This calls for a strategic approach in combination with specific methods of information and communication. In this respect, systematically closing and extending the value creation chains in the metal processing industry and also encouraging intelligent specialisation are primary objectives. One result of past experiences is the realisation „We‘re strong on our own – but even stronger together“; the cluster thrives on the ideas and activities of all of its stakeholders.

This master plan, the cluster‘s strategy paper, has been drawn up over eight months. It is the result of a participative process, and reflects the areas of action that the various stakeholder groups in the cluster considered priorities. The contents, recommendations and suggestions are aimed at all cluster stakeholders.

The Metal Cluster is charged with making a contribution to future-oriented, sustainable and integrative growth and the creation of more employment opportunities in the Berlin-Brandenburg region. It contributes towards developing solutions to the major challenges our society, this region and Europe as a whole are currently facing. In this context, the latest EU funding programme „Horizon 2020“ particularly focuses on the issues of „Health, Demographic Change and Wellbeing“, „Secure, Clean and Efficient Energy“, „Climate Action, Environment, Resource Efficiency and Raw Materials“ as well as the establishment of „inclusive, innovative and reflective societies“ in Europe. With its five declared objectives of „employment, innovation, education, social inclusion and climate/energy“, the EU‘s latest growth strategy „Europe 2020“ has set important guidelines for how to cope with these challenges. Accordingly, this master plan is aimed at helping the cluster to grow to ensure that it

can play a major role among the various specialised European regions whose areas of expertise will ideally complement each other in future. On the basis of the specific skills of the companies, scientific institutions and intermediaries in the cluster and through astute cooperation, the cluster will hopefully progress in the direction of accelerated development of innovative solutions to the key challenges of our times.

Under consideration of regional specifics, the state of Brandenburg's economic policy strategy is based on the European strategy and the German federal government's High-Tech Strategy, which was equally inspired by the EU strategy, to ensure the state's successful economic development. It is aimed at positioning the cluster and its stakeholders with their expertise in global and dynamically changing markets and niches, as well as international value chains and emerging industry sectors. The cluster work therefore focuses on both the further development of this expertise or the communication relationships in the areas of action identified as well as on the interfaces within the cluster or on the interfaces with other clusters in and increasingly also outside Brandenburg, and also on the recruitment, retention and further development of its qualified workers.

The interdisciplinary innovation efforts along the entire value creation chain, from initial research to market launch, and also the use of employment policy instruments for the recruitment, retention and further development of qualified workers correspond with the aims of the European Regional Development Fund (ERDF)[1] and the European Social Fund (ESF)[2]. Accordingly, the Metal Cluster's interfaces with the clusters „Energy Technology", „Food Industry", „Healthcare Industries", „ICT/Media and Creative Industries", „Plastics and Chemistry", „Photonics" and „Transport, Mobility and Logistics" promote an interdisciplinary approach. The Metal Cluster stakeholders frequently maintain customer and supplier relationships with the stakeholders in these clusters.

As neither the global development nor the regional synergy effects can be foreseen today, all of the activities in the cluster including this master plan are based on an „adaptive system" concept. This allows new scientific, economic and political impulses to be taken on board at an early stage.

Numerous cluster stakeholders from the business and scientific communities, local governments and business development agencies were involved in the participative process selected to draw up this master plan. Choosing this method at the cluster initiation stage promoted identification with the cluster, and

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[1] *European Regional Development Fund (ERDF); online URL: http://www.efre.brandenburg.de [10.03.2014].*

[2] *European Social Fund (ESF), online URL: http://www.esf.brandenburg.de [10.03.2014].*

allowed the integration of areas where there is currently a need for action from the perspective of the cluster stakeholders.[3]

The master plan divides the Metal Cluster‘s activities into three key areas of action: „Innovation Workshop“, „Collaboration Network“ and „Qualified Workforce Matrix“. In the course of the master plan development process, the businesses saw the qualified workforce aspect as a particularly important as well as a particularly difficult challenge; it was therefore designated a separate area of action. Internationalisation is an integrative issue that impacts on all three of the master plan‘s areas of action. Over the next few years, the challenge lies in highlighting the existing activities and implementing additional activities initiated by the cluster stakeholders. New networks within the business community as well as between business and science communities are therefore to be established in order to develop further synergies and to raise project funds, for example for the realisation of flagship or pilot projects.

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[3] *For the participative process, previous experiences gained in the course of addressing related issues served as a reference, cf. Kirchgeorg, Manfred [2011]: Die Wettbewerbsfähigkeit Mitteldeutschlands – Statusbericht und Handlungsansätze (a status report and summary of potential courses of action regarding competitiveness in Central Germany). Online URL: http://www.mitteldeutschland.com/uploads/media/HHL_Mitteldeutschland_online_2_01.pdf [05.08.2013].*

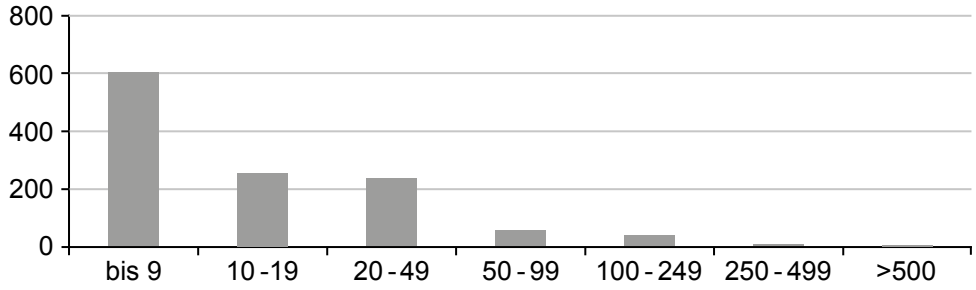
1.1 Brandenburg Metal Cluster Structure

The Brandenburg Cluster Metal Industry includes businesses, scientific and education institutions, networks, industry associations and business development agencies as well political and local government stakeholders who have jointly committed themselves to promoting the further development of the metal industry as the backbone of Brandenburg's economic structure. The cluster also maintains particularly close-knit links with suppliers from numerous other sectors. To name but a few, the Brandenburg metal industry supplies the automotive industry, the aerospace industry, the construction industry, the electronics industry and energy suppliers with components, products, processes and services.

Business Structure

The metal industry is one of the processing industries in Brandenburg that employs the most people and generates some of the highest turnover. According to the statistics for all of Brandenburg's administrative districts, there are 2,589 businesses with 36,965 full-time employees[4] in the region with heterogeneous technical backgrounds that work with the basic material metal at different value creation levels. There are a few major companies, but the cluster is largely made up of small and medium-sized enterprises that mostly employ less than 50 people.

Chart 1: Metal Cluster businesses according to number of employees[5]



The activities these companies are engaged in can best be described by roughly classifying them according to sector[6]. Key areas of activity in the Metal Cluster

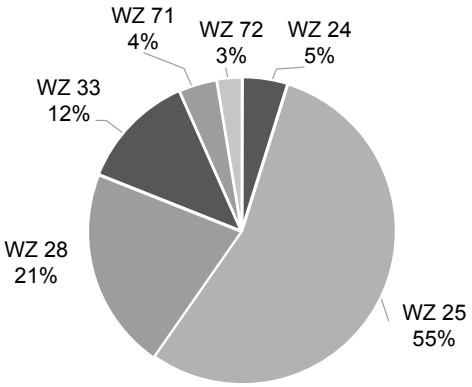
[4] *Federal State of Brandenburg, Ministry for Economic and European Affairs [May 2014, draft]: Development and Importance of Brandenburg's Industrial Clusters 2008-2012. Monitoring report, p. 11.*

[5] *PricewaterhouseCoopers AG [2012]: Tiefenanalyse für den brandenburgspezifischen Cluster Metall („In-depth Analysis for the Brandenburg-specific Metal Cluster"), p. 14.*

[6] *Based on German Classification of Economic Activities, NACE Revision 2 Edition 2008, online URL: https://www.destatis.de/DE/Methoden/Klassifikationen/ Gueter Wirtschaftklassifikationen /Content75/KlassifikationWZ08.html [13.01.2014].*

are metal production and processing, the manufacture of metal products, mechanical engineering and also the repair and installation of machines and equipment. Engineering firms as well as research and development can also be allocated to this cluster. The manufacture of metal products is the most common industrial sector here.

Chart 2: Metal Cluster businesses according to industrial sector („WZ“)[7]



WZ 2008	Industrial Sector
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
28	Manufacture of machinery and equipment n.e.c.
33	Repair and installation of machinery and equipment
71	Architectural and engineering activities; technical testing and analysis
72	Scientific research and development

The cluster‘s current expertise profile includes:

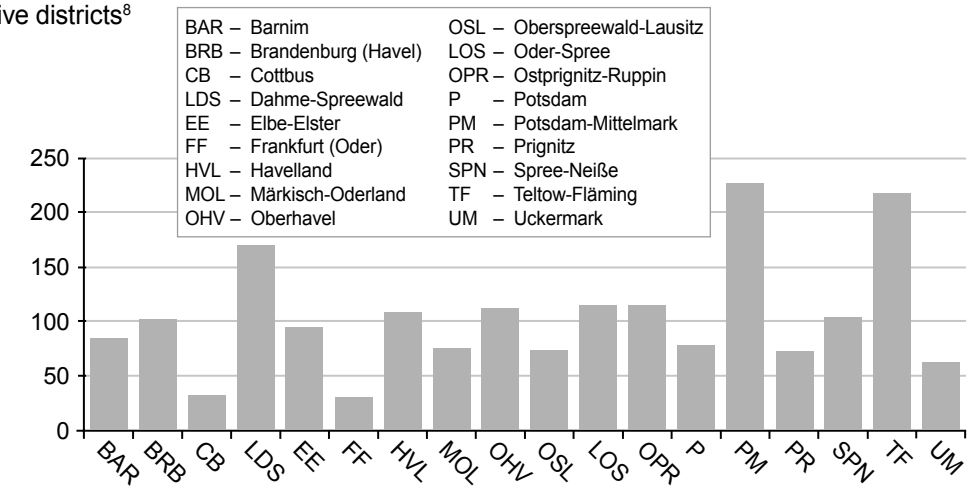
- the manufacture of taps and valves, construction of utility projects for fluids, manufacture of other tanks, reservoirs and containers of metal;
- automation engineering, electronic and mechatronic systems;
- sheet metal fabrication and processing;
- plant and machinery engineering, lifting and handling equipment;
- materials and energy efficiency technologies;
- new (raw) materials and light engineering;
- surface and coating technologies;
- renewable energy (including wind turbines, photovoltaic systems);
- steel production and metal casting;
- separation and joining technologies and
- toolmaking and construction of jigs and fixtures, off-the-shelf components.

[7] *PricewaterhouseCoopers AG [2012]: Tiefenanalyse für den brandenburgspezifischen Cluster Metall („In-depth Analysis for the Brandenburg-specific Metal Cluster“), p. 15.*

Regional Focuses

Metal industry companies exist in all of Brandenburg's administrative districts, in locations with a long respective industrial heritage as well as in locations where the industrial landscape has developed only recently. The administrative districts of Potsdam-Mittelmark, Teltow-Fläming and Dahme-Spreewald boast the highest number of companies that are active in the metal industry.

Chart 3: Proportion of metal industry companies in Brandenburg's various administrative districts[8]



Brandenburg's metal industry is represented particularly strongly in towns such as Brandenburg/Havel, Eberswalde, Eisenhüttenstadt, Finsterwalde/Massen, Fürstenwalde, Hennigsdorf, Lauchhammer, Ludwigsfelde and Prenzlau.

The designated Regional Growth Cores (RGC) generally play a major role in the regional implementation of the cluster strategy and also of the metal industry master plan. So far the Metal Cluster has been designated one of the most important clusters in the RGC Brandenburg/Havel, Cottbus, Eberswalde, Fürstenwalde, Frankfurt (Oder)/Eisenhüttenstadt, Luckenwalde, Neuruppin, Oberhavel, Schwedt/Oder, Spremberg, Westlausitz and Schönefelder Kreuz.

Research Landscape

There is a unique concentration of education and research institutions in the German capital region, and they are outstandingly excellent. The research subjects addressed in cooperation with international, national or regional collaboration partners include topics in the areas of mechanical engineering, electrical engineering, mechanics/mechatronics and automation engineering, production, process, processing and manufacturing technology, materials research, factory operations and also energy and environmental engineering. In addition, the region also offers expertise that is extremely relevant to all industries, including the metal industry, for example in the fields of economics and information technology.

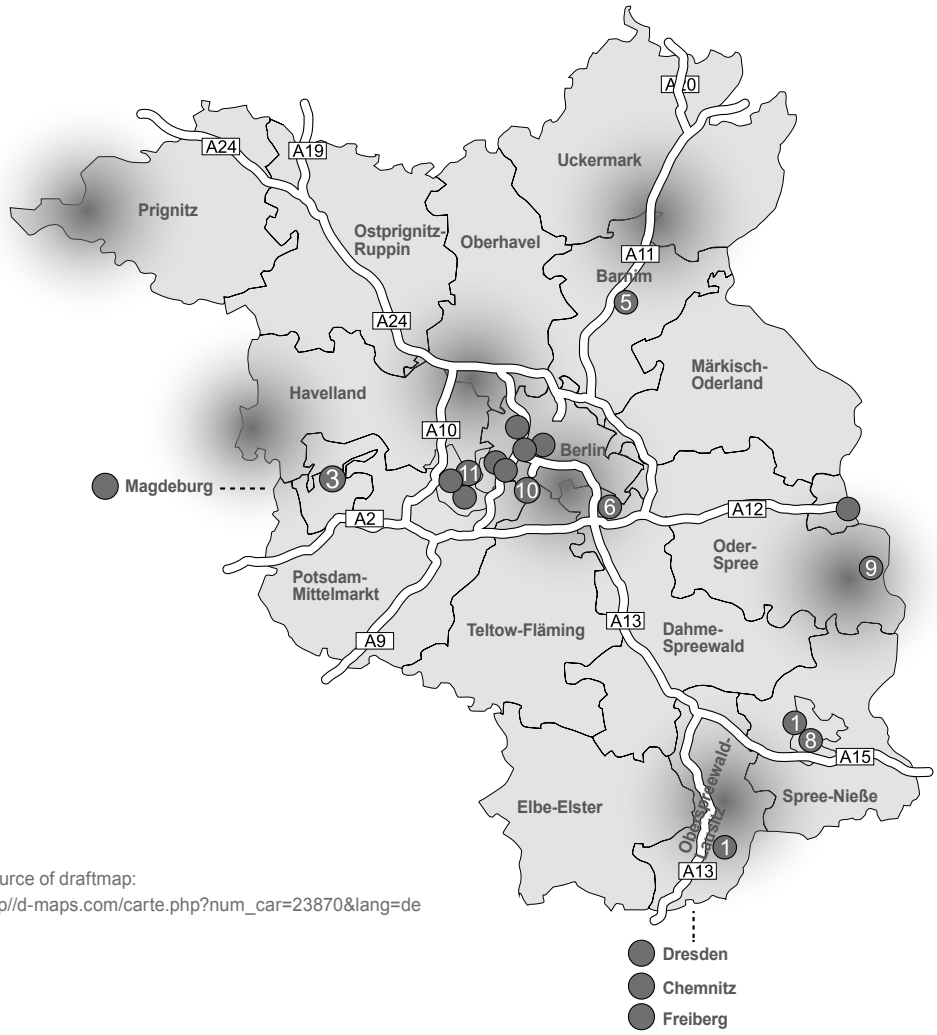
[8] *ZAB ZukunftsAgentur Brandenburg GmbH [2014].*

Universities and non-university institutions in Brandenburg and the neighbouring regions with some connection to the Metal Cluster[9] (excerpt)

1. Brandenburg University of Technology, Cottbus - Senftenberg
2. European University Viadrina Frankfurt (Oder)
3. University of Applied Sciences Brandenburg
4. University of Applied Sciences Potsdam
5. Eberswalde University for Sustainable Development
6. Technical University of Applied Sciences Wildau
7. University of Potsdam
8. Research centre for light engineering materials (Forschungszentrum für Leichtbauwerkstoffe Panta Rhei), Cottbus
9. Research and quality centre (Forschungs- und Qualitätszentrum GmbH), Eisenhüttenstadt
10. Institute for Thin Film and Microsensoric Technology, Teltow
11. Max Planck Institute of Colloids and Interfaces Potsdam
12. Fraunhofer Institute for Factory Operation and Automation IFF, Magdeburg
13. Beuth University of Applied Sciences, Berlin
14. Berlin University of Applied Sciences (Hochschule für Technik und Wirtschaft [HTW])
15. TU Berlin
16. Federal Institute for Materials Research and Testing (BAM), Berlin
17. Fraunhofer Institute for Production Systems and Design Technology IPK, Berlin.
18. Helmhotz materials and energy research centre Berlin (Helmholtz-Zentrum Berlin für Materialien und Energie [HZB])
19. TU Dresden
20. Fraunhofer Institute for Machine Tools and Forming Technology, Chemnitz
21. TU Bergakademie Freiberg

[9] *Brandenburg Metal Cluster information, online URL: www.metall-brandenburg.de/de/Cluster/Wissenschaft [28.01.2014].*

Chart 4: Overview of universities and non-university institutions in Brandenburg and the neighbouring regions with some connection to the Metal Cluster (excerpt, see list on page 8 for legend of numbers)



Source of draftmap:
http//d-maps.com/carte.php?num_car=23870&lang=de

Key Research Areas

- Applied industrial electrical engineering
- Automation engineering
- Civil engineering
- Biosystems engineering
- Electrical engineering
- Energy technology
- Energy and environmental engineering
- Factory operations
- Vehicle engineering
- Materials lifting and handling technology
- Industrial information technology
- Innovation research
- Communication technology
- Construction and fabrication
- Construction / product design
- Light engineering systems
- Light engineering materials
- Aerospace engineering and logistics
- Mechanical engineering
- Materials science and metallurgy (also in the nano and micrometer field)
- Mechanics/mechatronics
- Mechatronic system design
- Medical engineering
- Measurement and control engineering

- Metal foams
- Microelectronics
- Microsensor systems
- Sustainable economy
- Surface engineering
- Photonic technologies
- Production systems
- Production engineering
- Production management and control
- Process and processing technology
- Process visualisation
- Measurement and control engineering
- Sensory systems
- Safety engineering
- Simulation
- Solar applications
- Spectroscopy
- Instrumentation and control engineering
- Systems engineering
- Computer engineering
- Tribology
- Forming and forging technology
- Corporate governance
- Processing technologies
- Separation and joining technologies
- Supply engineering & logistics
- Raw materials/materials engineering
- Toolmaking
- Business information systems
- Knowledge management

Strengths and Weaknesses

Although Brandenburg's metal industry landscape is dominated by a few large metal companies, especially in the area of basic metal production, the business structure generally consists of numerous small companies. Germany's capital region is certainly a knowledge landscape with a high excellence potential in research and education; the cluster is therefore well-placed for positive development. The following list[10] highlights some of the cluster's strengths and weaknesses.

Strengths

- Solid stock of companies that have evolved over time in traditional locations
- (Technological) diversification reduces susceptibility to crises
- High flexibility in terms of supplier expectations and market developments
- Scientists open towards and successfully involved in research collaborations
- High training and education level of the qualified workforce
- Wide range of university courses and vocational training offers available in cluster-relevant fields
- Good cooperation between the business community and public stakeholders

[10] *PricewaterhouseCoopers AG [2012]: Tiefenanalyse für den brandenburgspezifischen Cluster Metall („In-depth Analysis for the Brandenburg-specific Metal Cluster"), p. 44, with additions.*

Weaknesses

- Business structure consists of numerous small companies
- Diversified spatial clustering of business locations and research facilities
- Still insufficient regional input and sales networks
- Still not enough corporate in-house research and development
- In part low attractiveness of jobs in remote locations
- Still too few cooperation and sales activities involving Eastern Europe

1.2 Previous Activities

Initial Situation[11]

Although the cluster's strategic industrial locations are far spread, the Metal Cluster is characterised by close links that have been supported by national and regional networks over many years. The two industry networks „Steel and Metalworking Network in the Berlin-Brandenburg capital region – profil.metall.[12] and „Netzwerk der Metall- und Elektroindustrie in der Hauptstadtregion – ME-Netzwerk"[13], the capital region's metal and electronics industry network, were established in 2007. The ME-network is supported by the Berlin and Brandenburg metal and electronics industry association (Verband der Metall- und Elektroindustrie in Berlin und Brandenburg, VME). It aims to maintain the competitiveness of the capital region's metal and electronics industry businesses, and to improve it long-term. The objectives of the profil.metall network, which is coordinated by IMU Institut Berlin GmbH, include improving corporate competitiveness, the recruitment and retention of well-qualified workers and helping companies to gain a high profile as system and solution providers. At the same time, the industry network profil.metall also takes on the role of umbrella organisation for the regional networks „South Brandenburg Metals and Electrical Industries Consortium" (ARGE MEI), „Eisenhüttenstadt Metalworking and Environmental Technology Association" (KoMU), „Barnim Metals Network" (NMB) and „Prenzlau Business Forum" (WFP).

With the support of the master craftsmen guilds and profil.metall, the metal industry's opportunities for dialogue and networking have consistently been pursued with an annual series of events entitled „Synergies with Steel", initiated in 1998. From 2013 onwards, this series of events has also been continued with the new „Metal Cluster Conference" with the participation of the ME-network. Between March 2008 and September 2012, the industry transfer office for the steel, metal and electronics industries „Stahl Metall Elektro"[14]helped companies

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[11] *PricewaterhouseCoopers AG [2012]: Tiefenanalyse für den brandenburgspezifischen Cluster Metall („In-depth Analysis for the Brandenburg-specific Metal Cluster"), p. 28, with additions.*

[12] *URL: http://www.profil-metall.de [28.01.2014].*

[13] *URL: http:// www.me-netzwerk.de [28.01.2014].*

[14] *Financed with funds provided by the European Regional Development Fund and the state of Brandenburg's Ministry for Economic and European Affairs.*

to define research and development needs, brought the business community into contact with the scientific community, and also assisted with the initiation of research and development projects.

Between March 2010 and February 2013, IMU Institut Berlin GmbH realised region-specific pilot campaigns aimed at the establishment and support of a metal industry cluster with the ERDF funded C-PLUS project „Implementing World Class Clusters in Central Europe“ together with partners from Italy, Poland, the Czech Republic, Hungary and Austria. The project‘s results and activities were integrated into the cluster management. At the Brandenburg Metal Cluster‘s initiation stage, this cooperative process allowed the application-related transfer of project results, and was presented as a best practice example at the international forum „World Class Clusters and Regional Dynamism“ in Bologna in April 2013.

Organisation of the Cluster Structures and Master Plan Process Structure

On the basis of the already mentioned well-established networking activities, the establishment of the cluster began with a kick-off event during the „Synergies with Steel“ conference in Eisenhüttenstadt in November 2012. Accompanying structures were put in place to support the development within the cluster: a cluster spokesperson was tasked with representing the cluster externally. The implementation of activities is supported by the cluster management. A strategy council advises the cluster on its strategic direction. This consists of selected representatives from the business community, industry associations, networks, social partnerships and research institutions. Through its close ties, it promotes increased technology and knowledge transfer between the cluster stakeholders. Due to its interdisciplinary makeup, the council involves the various – regional as well as national and international – stakeholders in the cluster process.

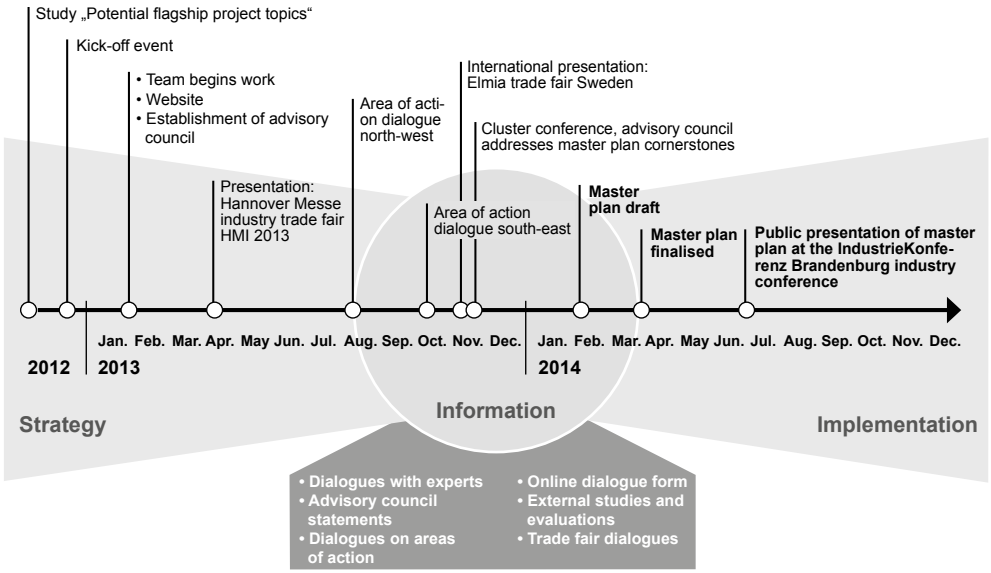
Printed and digital media for the external communication and marketing activities were developed to highlight the cluster‘s strengths and expertise more clearly and to raise the cluster‘s profile in general. The cluster‘s expertise profile has already been successfully presented at leading national and international industry trade fairs.

During the first sitting in February 2013, the council agreed the three proposed areas of action identified together with the cluster stakeholders. Prior to that, active involvement with the cluster had been encouraged in numerous dialogues with experts whose analytical knowledge and previous experiences were also valuable when it came to defining the cluster‘s purpose more clearly. These dialogues represented the first step of the approach decided on for involving the cluster‘s stakeholders in the development of the Cluster master plan. One important milestone during the master plan development process was the format of the area of action dialogue regarding the metal industry‘s outlook for 2020 („Perspektiven Metall 2020“); its contents were completely redefined. Two dialogue events with moderator-led working groups were organised and held in August

2013 in Neuruppin and in October 2013 in Cottbus. On the basis of a driver/enabler matrix based on funding-relevant EU issues and the evaluation of cluster-relevant studies[15], the important key issues to be covered by the master plan were identified and prioritised by way of an electronic poll. The matrixes were extended and further details were added on the basis of the content information from this poll. The high priority issues were discussed more in-depth at a second dialogue event. In November 2013, the council agreed all of the key issues identified, and the master plan cornerstones were presented at the cluster conference in Eisenhüttenstadt. Until mid-January 2014, more important suggestions and proposals were put forward in the course of further dialogues with opinion leaders and disseminators, and also by means of an online dialogue form on the cluster website.

The following chart provides an overview of the master plan development milestones so far.

Chart 5: Master plan development process milestones



[15] *Cf., for example, IMU Institut [2012]: Identifizierung von Themen für potentielle Leitprojekte im Brandenburger Cluster Metall („Identification of key issues for potential flagship projects in the Brandenburg Metal Cluster“). LASA Brandenburg [2013]: Der Arbeitsmarkt der Brandenburger Metallbranche („The employment market in Brandenburg‘s metal industry“). PricewaterhouseCoopers AG [2012]: Tiefenanalyse für den brandenburgspezifischen Cluster Metall („In-depth Analysis for the Brandenburg-specific Metal Cluster“) Chemnitz University of Technology on behalf of the federal German government‘s commissioner for the new Länder [2012]: Wie werden wir morgen produzieren. („How will we produce tomorrow.“)*

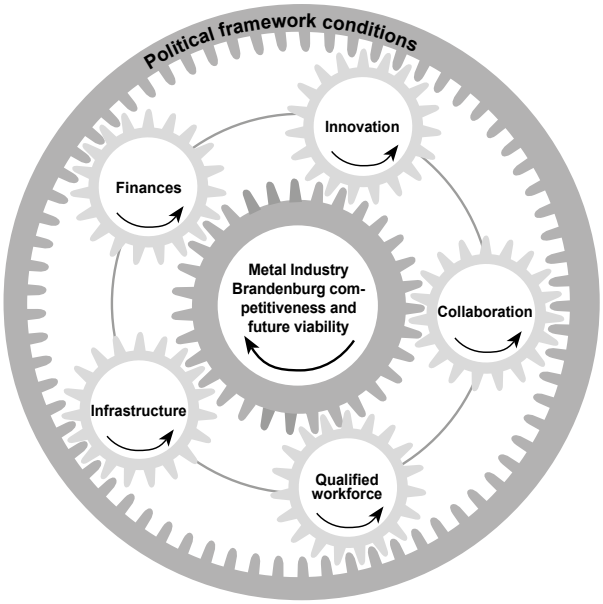
2 STRATEGY

The Metal Cluster Brandenburg's strategy is embedded in the regional government's economic policy and strategy („Stark für die Zukunft – Kräfte bündeln"[16]), which is an amalgam of three integrative economic policy programmes:

- the „Mittelstandsstrategie" [2010], which focuses on medium-sized enterprises,
- „innoBB", the joint innovation strategy of the states of Berlin and Brandenburg [2011],
- „ProIndustrie", Brandenburg's political framework and action plan for the industry [2012].

Brandenburg's cluster strategy, which in addition to the innoBB also envisages the establishment and expansion of the Metal Cluster, for example, is supported by the „Cluster process, networking and innovation" area of action in the „ProIndustrie" framework and action plan. The objectives and focuses of the growth strategy „Europe 2020" and the funding programme „Horizon 2020" have been a major source of inspiration for the cluster strategy. In addition, the Metal Cluster Brandenburg's strategic orientation in the three areas of action also takes the European Regional Development Fund (ERDF) and the European Social Fund (ESF) guidelines into account and supports these with potential project topics.

Chart 6: Synergistic effects of drivers and areas of action



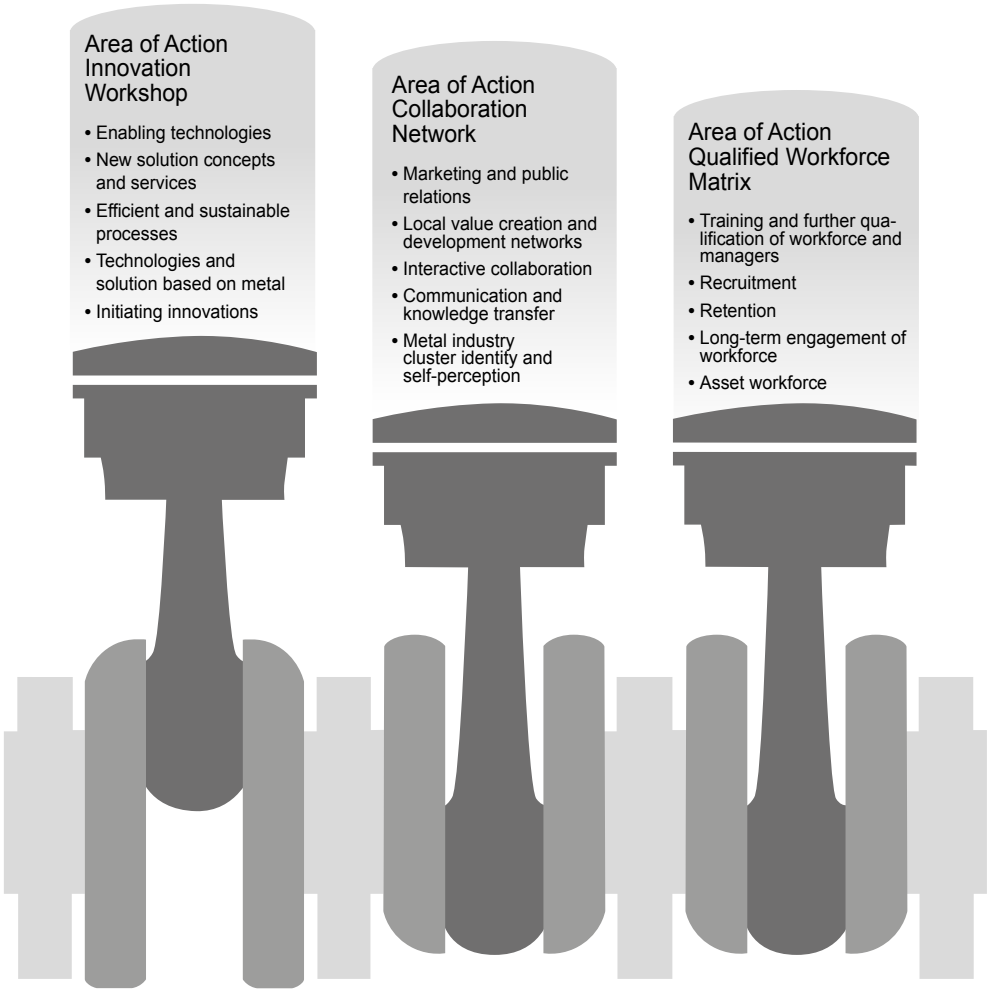
[16] *Online URL: http://www.mwe.brandenburg.de/sixcms/detail.php/bb1.c.175274.de [05.08.2013].*

3 AREAS OF ACTION

The three areas of action „Innovation Workshop Metal Cluster Brandenburg“, „Collaboration Network Metal Cluster Brandenburg“ and „Qualified Workforce Matrix Metal Cluster Brandenburg“ illustrate the major challenges and opportunities the Metal Cluster Brandenburg businesses, researchers and intermediaries intend to tackle. To identify the areas of action, five cornerstones and a total of 38 key issues were determined on the basis of the overall 130 issues proposed by the cluster stakeholders. Due to the metal industry‘s wide range of concerns and involvement, these address important issues that affect the industry in many different ways, such as raw materials/materials, production and automation technology, clean technologies and safety/security.

Using a combustion engine by way of an analogue example, the following chart clearly illustrates the synergistic effects of the three areas of action and therefore indicates the necessity of working in all three areas of action dynamically and at the same time continuously to achieve comprehensive effectiveness.

Chart 7: Synergistic effects of areas of action and cornerstones



The 38 key issues reinforce existing strengths („strengthening strengths"), develop expertise-oriented approaches further („keeping up") or are aimed at the development of long-term market opportunities (new options).[17] Each of the key issues includes a brief description of its relevance to the cluster and the potential it harbours. Summary information about ongoing and recently completed R&D projects has been included in the potential description.[18] However, the respective number of potential project topics for each key issue is by no means a conclusive indicator of a particular key issue's potential.

Topics also of relevance to other Brandenburg and Berlin-Brandenburg clusters ("cross-cluster interfaces")

Due to their close ties with various industries, the Metal Cluster Brandenburg stakeholders maintain a great number of varying supplier/customer relationships with stakeholders in other Brandenburg and Berlin-Brandenburg clusters. In addition, the innovation potential is particularly high at these „cross-cluster interfaces". To consistently develop the cluster and its stakeholders further in a way that ensures future viability, effective cross-cluster collaboration is therefore the ultimate aim. In this context, the following „cross-cluster interfaces" are particularly worth mentioning:

Cluster Energy Technology

- Materials and technologies for new energy technology applications, e.g. in the area of renewable energy (key issues 1, 2 and 17)
- Energy efficiency (key issue 8)

Cluster Food Industry

- Plant and machinery (key issues 2 and 14)
- Materials for aggressive environments (key issue 1)

Cluster Healthcare Industries

- Medical supplies and equipment (key issues 5, 15)
- Surface engineering (key issue 1)
- Implants (key issues 5, 15)
- Workplace health management (key issue 36)

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[17] *See also Chapter Summary, charts 14, 15 and 16.*

[18] *Weißhaupt, Rita (BTU Cottbus – Senftenberg) [2013]: Research on completed and ongoing R&D projects relevant to the Brandenburg Metal Cluster. Sources taken into account in this research were the German federal government's „funding catalogue", the German research foundation (DFG) database and the research alliance AiF database.*

Cluster ICT, Media and Creative Industries

- Product design, industrial design (key issue 5)
- Digitalisation of business processes, e.g. with the aid of RFID[19] and NFC[20] (key issues 6, 11 and 12)
- IT security and IT-based security (key issues 6, 11 and 12)

Cluster Plastics and Chemistry

- Light engineering/composite materials, hybrid metal-plastic systems (key issue 3)
- Product design (key issue 5)
- Availability and retention of qualified workers in the periphery (key issue 32)

Cluster Photonics

- Material processing lasers (key issue 2)
- Application of new light technology and microsystem technology developments, e.g. in the area of metal-based 3D printing (key issue 2)
- Lasers for process measurement and quality control systems (key issues 10 and 13)

Cluster Transport, Mobility and Logistics

- Manufacturing technologies and processes (key issue 2)
- Light engineering (key issue 3)
- Maintenance, repair and overhaul (MRO) (key issue 7)
- Resource and energy efficient processes (key issue 8)
- Component and process auditing (key issue 10)
- Sustainable transport (key issue 19)
- Initiating innovations (key issue 22)
- Availability and retention of qualified workers in the periphery (key issue 32)

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[19] *RFID: radio-frequency identification – identification with the aid of electromagnetic waves*

[20] *NFC: near field communication – an international near field communication transmission standard*

Internationalisation

From a cluster perspective, there are several dimensions to internationalisation. These range from export to international research collaborations and attracting new international companies to Brandenburg. Internationalisation is therefore an issue that affects all areas of action, and one that is of major importance for the cluster management and also for all stakeholder groups.

Fundamentally, the cluster is in a good position when it comes to internationalisation. Many of the businesses in this cluster already maintain international relationships, mainly through export. However, they are currently not generating a significant proportion of their turnover with exports[21]. As the international competition is growing increasingly fierce and the market is under pressure to supply not only innovative metal products but also additional related services, internationalisation that goes further therefore also becomes increasingly more important. The same applies to international research and development collaborations.

The cluster management is also making more concerted internationalisation efforts within the scope of its international relationships with partner clusters and regions. In view of the increasing pressure to internationalise exerted by the global competition, and in view of the opportunities that may also arise in the course of these international efforts, the cluster management considers the focused identification and further development of the international collaboration potential of the regional stakeholders and the region in cooperation with the Enterprise Europe Network (EEN) an important task. The cluster as such can increase the visibility of its stakeholders through a stronger international focus that makes international collaborations and business relations easier.

Active internationalisation approaches also guide the actions of the networks in the cluster. For example, the focus of the dialogue with the European partners has shifted towards vocational training and qualified workforce development aspects. Various vocational training institutions utilise particularly the close proximity to Poland to jointly overcome the challenge of a shortage of qualified workers in the metal industry. International activities also make it easier for trainers and young recently qualified metal and electrical industry workers to access international know-how and to acquire transnational expertise. For years now, business development and vocational qualification agencies have therefore been organising meetings, internships and further qualification courses within the scope of the „Leonardo da Vinci“ international exchange and lifelong learning programme for young adults and skilled workers, or for example the „European Youth Olympics“ to promote intercultural openness, tolerance and free movement within the European employment market, which has been held since 2009 in the Lausitz region.

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[21] *PricewaterhouseCoopers AG [2012]: Tiefenanalyse für den brandenburgspezifischen Cluster Metall („In-depth Analysis for the Brandenburg-specific Metal Cluster“), p. 22.*

The current EU framework programme for research, development and innovation, „Horizon 2020“, establishes important framework conditions for the next few years and also offers the stakeholders in the Metal Cluster an opportunity to contribute their expertise to international collaborations with partners, to pick up on trends and to develop their own profiles and offers further at an international level. However, it is often considerably difficult for SMEs to gain access to EU project partnerships. An increasingly international approach must therefore also take the specific needs of the region‘s SMEs and their opportunities into account. Besides the framework programme „Horizon 2020“, the European funding programme for promoting the competitiveness of enterprises and SMEs, COSME[22], also supports the internationalisation efforts of businesses, for example with regard to gaining access to international markets.

However, other funding alternatives at a national and especially at a regional level are also available, for example financing provided by the European Regional Development Fund (ERDF) Operational Programmes and the European Social Fund (ESF). The Brandenburg state government ministry for employment, social services, women and families (Ministerium für Arbeit, Soziales, Frauen und Familie, MASF) supports the internationalisation efforts of small and medium-sized enterprises by funding such measures as language courses for employees or training courses that focus on selling in foreign markets, and provides information on the framework conditions with regard to the recruitment and retention of qualified international workers within the scope of the lifelong learning directive.

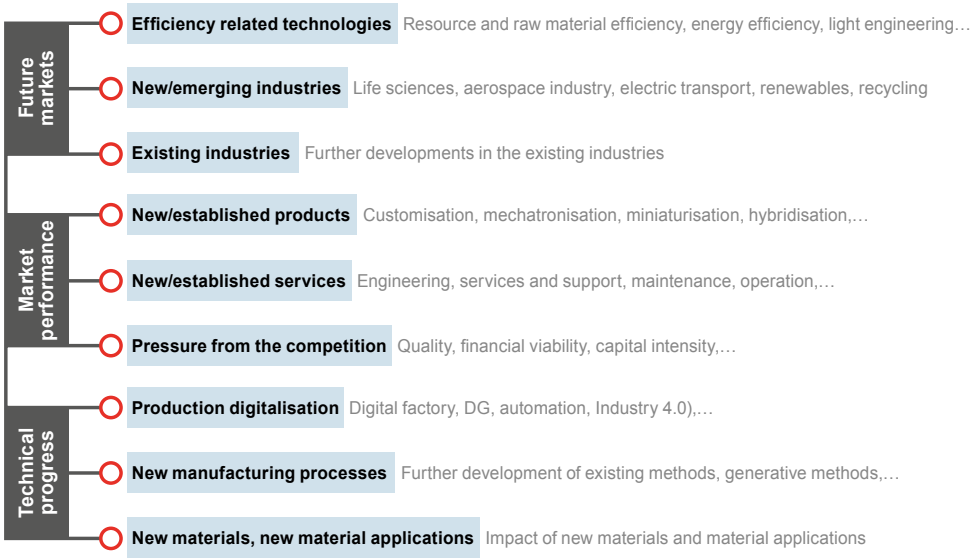
[22] *Competitiveness of Enterprises and Small and Medium-sized Enterprises (SMEs)*

3.1 Brandenburg Metal Industry Innovation Workshop

Area of action profile

Industrial production is the basis for the wealth of modern societies. Innovations therefore have a decisive impact on stabilising and increasing an industry‘s competitiveness. Ideas and developments for new as well as for established technologies, materials and processes, products and services, business models and also organisational processes give the region‘s businesses the decisive inspiration that is needed to stand out from other market stakeholders, and to create an image for the brand „Metal from Brandenburg“ that stands for quality and innovativeness. In this context, the cluster‘s businesses are facing new challenges: due to the increasingly closer links between the industry and information and communication technologies, the value creation chains and industrial service structures are currently undergoing a transformation. One aim of the „Brandenburg Metal Industry Innovation Workshop“ is to help the businesses to make use of the associated opportunities, and to translate them into innovative solutions. The area of action „Brandenburg Metal Industry Innovation Workshop“ therefore includes the topics „future markets“ and „technical progress“.

Chart 8: Area of action „Brandenburg Metal Industry Innovation Workshop“ drivers



Area of action objectives

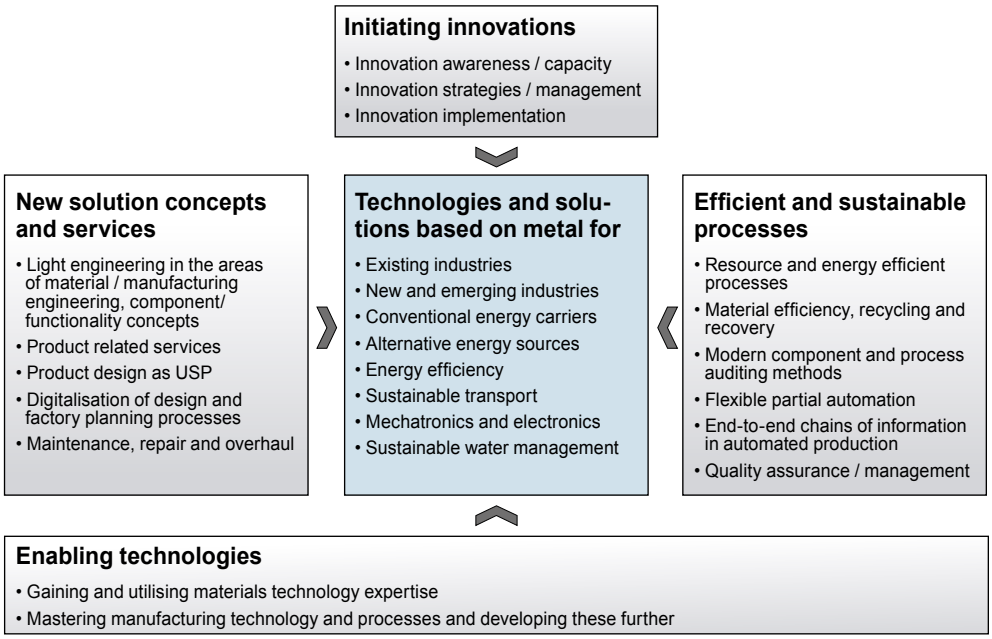
The aim of the activities and initiatives in the area of action „Innovation Workshop“ is the further expansion of the cluster stakeholders‘ innovation capabilities in order to thereby increase the companies‘ value creation capabilities and the region‘s science excellence. In this respect, important aspects are the development of new products, processes and services and the use of future-oriented technologies for existing, new and emerging industries. With a view to the environment and costs, another aim is to increase the efficiency of the material and energy usage.

Cornerstones

Due to the varied solution approaches of the Metal Cluster, which has a very wide spectrum in terms of areas of application, 22 key issues were chosen from a great number of issues as particularly relevant. These can be divided into the following five cornerstones:

- Enabling technologies
- New solution concepts and services
- Efficient and sustainable processes
- Technologies and solutions based on metal
- Initiating innovations

Chart 9: Area of action „Brandenburg Metal Industry Innovation Workshop“ cornerstones



The basis for technological and economic progress is the expansion and application of the technological expertise. In the Metal Cluster, the focus is therefore particularly on material- and manufacturing- oriented issues. Innovations can be differentiated into innovations that enable new solution concepts and services and innovations that improve the efficiency and sustainability of the value creation processes. Both are relevant to competitiveness and future viability. Together with a strong understanding of the market and the customers with regard to existing and new areas of application, especially in connection with the sustainable design of current and future energy and transport needs, this allows the development of new value creation contributions. Important prerequisites, particularly in small and medium-sized enterprises, are innovation awareness and the ability to also realise these innovations in-house or in cooperation with partners. This also clearly illustrates the close links to the areas of action „Collaboration Network“ and „Qualified Workforce Matrix“. From a cross-cluster perspective, all of the projects, measures and activities in all of the five cornerstones must be promoted as these will primarily lead to an improvement of the cluster stakeholders‘ competitiveness and market position if pursued cooperatively.

1 Gaining and utilising materials technology knowledge

Objective

Coordinating and specifically promoting material technology research, development and innovation activities with a focus on future market and user requirements

All metal-related activities should focus on research, and the development and application launch of new materials or material combinations as well as the further development or identification of new applications for already established materials. For example, optimisation of functional properties through the use of high or highest strength materials or through improved corrosion inhibition or life-cycle extension through the application of knowledge gained in the field of resilience engineering. In this area, the focus is on the research and development (R&D) activities pursued by the universities, research institutions and metal manufacturing and processing companies.

Relevance

Aside from metal working, the metal industry is based on material technologies. New and further developments are of key importance for new and improved applications in the various industry sectors and on the part of the customers.

Potential

Material technologies have great potential and harbour numerous future options for the region. For example, the areas of sustainable energy and improving efficiency both in terms of raw material and energy requirements as well as in terms of the profitability of existing applications are new fields of application. The range of potential technical applications is extensive. It is therefore essential that the current respective knowledge is expanded in order to develop new applications in future fields, for example in the area of high strength, high temperature, corrosion and wear resistant materials. Material developments can also contribute to the safety of manufacturing processes. Another field of activity is structured materials and hybrid composite materials that are tailor-made to fulfil multiple component requirements due to their specific properties, as exemplified by the simultaneous need for structural rigidity, light engineering and functional property integration. Innovation potential is therefore likely to be found where material technology meets specific application areas (medical engineering, aircraft construction, electric transport and others) and also other technology fields such as polymer engineering, for example.

Ongoing or past research projects in this area focus(ed) on topics such as surface coating technologies aimed at improved corrosion or wear resistance.

Potential project topics

- Micro-structuring of surfaces (improvement of flow dynamics, wear resistance)

- Innovative molten metal treatment and melting processes through integrated control and metering systems (foundries)
- Development and introduction of environmentally friendly magnesium casting processes with substitute SF6 inert gas atmospheres (foundries)
- Development of layers with functional properties (corrosion and wear resistant layers and reactive layers)
- Assessment of the need for a materials engineering colloquium with a necessarily high number of business representatives in order to identify the market and application requirements with a view to practical application oriented R&D projects.

2 Mastering manufacturing technologies and developing them further

Objective

Supporting Brandenburg-based businesses in the area of technology and process development in order to increase their operating efficiency and improve the properties of their products

From raw material to semi-finished product to component and functioning product – all of these steps involve various fabrication and manufacturing processes. These must be mastered and developed further. Characteristic for the Metal Cluster is the wide spectrum of processes applied. These include primary shaping and casting, metal working, separation methods (particularly cutting), joining and coating technologies and also property alteration processes such as heat treatment methods.. Due to the high number of businesses with the respective expertise in the cluster, the main focus here is on joining technologies, primary shaping technologies and surface engineering.

Relevance

Manufacturing process expertise and the further development of these processes is key for the metal industry, and closely linked to the field of material technologies. They determine successful product performance and therefore also impact on business profitability.

Potential

Like materials engineering, the mastering and further development of manufacturing technologies unlocks a wide range of new opportunities in almost all areas of application, from clean technology to the manufacture of medical supplies and equipment. These technologies are also the basis for profitable production and therefore contribute to value creation. Again, the research and development objectives in this area should focus on existing and new applications or serve the improvement of process and resource efficiency.

Ongoing or past research projects in this area focus(ed) on topics such as the hybrid joining or multi-material composites or innovative or improved manufacturing methods for specific materials or requirements.

Potential project topics

- Development of innovative joining methods for the safe and experts production of multi-layered composite materials (automotive industry suppliers)
- Development of innovative production methods for the manufacture of coated coils and extruded profiles in cold and hot rolling mills (automotive industry suppliers)
- Coating technologies and materials using thermal spraying, plasma technologies and the treatment of materials with lasers
- Development of automated melting and molten metal treatment methods and processes for light engineering alloys forming using nanocrystal alloy components.
- Development of production plants and methods for accelerated near net shape and net shape machining of 3D product geometries
- Development of methods and process for the production of structured surfaces in casting moulds
- Development of combined methods for the production of structured sheet metals through microforming
- Development of production plants and methods for generative and additive manufacturing processes for metallic materials (3D metal printing)
- Development of joining technologies for 3D component interlocking and bonding
- Self-optimising joining with laser beam and metal inert gas welding
- Development of new joining technologies under consideration of existing energy sources (laser, induction, arc discharge etc.)
- Lobbying for the establishment of an industry independent research, demonstration and qualification centre to promote the innovation capabilities of SMEs in the metal industry
- Communication of the benefits of manufacturing technology developments

New Solution Concepts and Services

3 Light engineering based on material and manufacturing technologies as well as component and working concepts

Objective

Continuation and expansion of the activities in the area of light engineering with a stronger focus on practical applications

The field of light engineering includes the areas of materials and fabrication light engineering as well as construction and construction part light engineering. Light engineering strategies include, for example, the substitution or combination with lightweight materials or the use of alternative production processes that allow the integration of functional properties or a material input that is in line with the required load-bearing capacities.

Relevance

Light engineering meets different needs such as environmental protection and the conservation of resources alone because of the lower quantities of material consumed by the manufacturing process. The use of light engineered materials therefore offers benefits, for example through moving mass weight reduction – and not least through a lower energy requirement at the product use stage. Light engineering frequently also has secondary effects, as it demands less in terms of structural engineering statics and kinematics. It is therefore gradually reducing the weight of parts used by the automotive industry. This principle also applies to tools and to plant and equipment (light plant and equipment engineering)

Potential

The potentials resulting from light engineering realisation are extremely diverse. Costs can be lowered not only because less material is required but also through constructions that allow the targeted used of cost efficient manufacturing processes. Focusing on light engineering can also have a positive impact on image. Exploiting the potential offered by light engineering is therefore the objective of this key issue. In this respect, Brandenburg can build on a wide range of research and business expertise.

Ongoing or past research projects in this area focus(ed) on topics such as processing methods for multi-material composites or the adaptation of light engineered product manufacturing processes to allow production at an industrial level.

Potential project topics

- Development of innovative adhesive technologies in the area of materials engineering, lightweight mouldmaking and light engineered construction parts (mechanical engineering in general)
- Laser joining technologies for high strength steels including calculation (localised energy supply)
- Development of ignition-inhibiting magnesium alloys for light engineered components for the automotive industry using environmentally friendly inert gas atmospheres and application-oriented subsequent processes.
- Development of innovative materials engineering, lightweight mouldmaking and light engineered construction part concepts for electric vehicles. For this purpose, development and expansion of modular structural component groups and adapted joining technologies
- Development of equipment and processes for the automated adhesive joining of light engineered multi-material composite structures and components
- Aluminium light engineering with the aid of photonic tools for automatic welding
- Increased marketing of the business location as a light engineering focused region in cooperation with the Plastics and Chemistry Cluster.
- Establishment of a centre for energy and resource efficient light engineering in cooperation with the Plastics and Chemistry Cluster.

4 Product related services

Objective **Diversifying value creation through product related services**

Besides the development, production and marketing of products, the usual core business of the companies in the Brandenburg Metal Cluster, product related services such as training courses or servicing, repair and maintenance are an obvious choice for sensibly diversifying a company‘s range of offers.

Relevance In consequence of the increasing competitiveness in the manufacture of high quality products, additional value creation must be incorporated as a further USP to ensure survival on the national or global market.

Potential Additional services that are based on the core expertise of product functionality and an understanding of customer needs primarily make it possible to increase the level of customer satisfaction and therefore encourage customer loyalty. At the same time, they increase the value creation volume and strengthen a company‘s position on the market. Businesses must therefore be supported when it comes to the addition of product-related services to their range of offers to gain competitive advantages.

Potential project topics

- From manufacturer to problem solver - service strategies for medium-sized companies in the metal processing industry (plant and machinery engineering)
- Management of control of intralogistics processes in metal processing businesses
- Safety as a service - monitoring and control of logistics processes in metal processing businesses with the aid of telematics
- Communication of information and potential harboured by providing product-related services. Encouraging the exchange of experiences

5 Unique Selling Proposition product design

Objective **Developing the potential harboured by differentiating product design**

Design makes it possible to ensure that a product works in the way a user needs it to work. The most obvious aspect of design is the look of a product. Beyond this, different technical or functional properties can be combined and improved as a whole. Integrated design approaches make it possible to achieve functional improvements as well as material and process optimisations.

Relevance

The impact of product design is frequently underestimated. As a sign of quality, it is an important marketing tool and a strategic element for producing a unique selling point. A product that has won design awards can emphasise a company's expertise as it is a good advertisement. Two Metal Cluster examples are the modular house „ar-che", which is manufactured by a Massen-based metal engineering company, and the double boom harbour crane „Adler 1500" made by a company based in Eberswalde; both won a Brandenburg Design Award in the „Industrial and Product Design" category in 2008.

Potential

Product design allows products to stand out from those manufactured by the competition and therefore makes it easier for products to become established on the market. An important successful design factor is taking these aspects already into account at the product development stage. The relevant expertise can be developed in the course of vocational training and further qualification and through a combination with technical aspects.

Potential project topics

- Communication of information about the potential harboured by product design in cooperation with the ICT/Media and Creative Industries cluster.

6 Digitalising design and factory planning processes

Objective

Firm establishment of the respective expertise throughout Brandenburg in order to efficiently use digital design and fabrication processes

The digitalisation of design and factory planning processes includes the mathematical/physical modelling and simulation of the component layout and also of the manufacturing and factory processes.

Relevance

In view of the fact that products and therefore also their manufacturing requirements are becoming increasingly more complex, an end-to-end planning chain to accelerate the respective developments is an important element for maintaining economic and future viability.

Potential

The digitalisation of development and planning processes creates transparency when it comes to the planning contents and the production system requirements. Changes can be understood and implemented more efficiently, and alternative production scenarios can be simulated. This will ultimately result in time and cost savings. Information about the factory and its processes permit flexibility up to adaptive engineering. In this respect, companies must be supported in terms of the process organisation and also with regard to equipping them with the requisite software infrastructure. On the training side, relevant education offers by universities and other educational institutions must be increased.

Ongoing and past development projects in this area focus(ed) on topics such as data library optimisation and manufacturing planning.

Potential project topics

- Use of innovative 3D printing systems in tool-, mould- and die-making.
- Use of 3D technologies (VR, AR[23]) to improve workforce participation and also to involve residents in infrastructure projects. Expansion as per Association of German Engineers VDI-Standard 7000 „Early public participation in industrial and infrastructure projects“
- Simulation methods for the synergetic analysis and optimisation of factory and equipment efficiency with all energy carriers included
- Mobile, digital production assistant to support planning and operational processes
- Geo-based command and control centres for the integration, visualisation and management of factory-oriented intra-logistics processes
- Helping the trades to utilise virtual technologies

7 Maintenance, repair and overhaul (MRO)

Objective **Application transfer and marketing of established MRO service consepts**

The maintenance, repair and overhaul of the equipment companies have invested in represents a separate, growing business market. Going by the experiences gained in the air and rail transport area, MRO services for investment intensive plant and machinery or also in the area of wind turbine repowering can also be designed commercially successful.

Relevance On the one hand, Brandenburg is an expansive region that calls for special strategies and business models to be able to carry out MRO services effectively and efficiently. On the other hand, the already existing expertise in the transport sectors makes it possible to offer these services nationally and internationally.

Potential In this respect, Brandenburg can draw on the positive experiences gained in the air and rail transport sectors and transfer these to other areas of application with a focus on metal. There are openings here not only in the mechanical and plant engineering field but also in the area of supply and waste management infrastructures, and especially energy supply and transmission infrastructures. Together with offers in the clean-tech product and services area, this can result in visibility beyond the regional borders.

Ongoing or past research projects in this area focus(ed) on topics such as special maintenance and repair methods for renewable energy production systems or

[23] *VR – virtual reality, AR – augmented reality*

were carried out by the Fraunhofer Innovation Cluster Maintenance, Repair and Overhaul with a focus on various MRO related aspects.

Potential project topics

- Development and use of parallel kinematic systems for the repair and installation of large parts (machining, surface treatments, in-situ measurement and control)
- Proactive maintenance management through the targeted evaluation of large volumes of heterogeneous data from various data sources
- Condition monitoring based maintenance concepts, wind turbine repowering

8 Resource and energy efficient processes

Improving competitiveness by reducing the resource and energy consumption of metal industry processes — Objective

Metal production and processing are based on numerous resource- and energy-intensive processes. Using material and energy resources efficiently helps to protect the environment and reduces the costs. Economic concepts that take environmental protection into account must therefore be developed and implemented.

In view of rising energy costs, increasingly scarce resources and the growing need to protect the environment, designing processes – particularly those in the metal industry – in a way that makes them resource- and energy-efficient is of major importance. — Relevance

Saving energy and conserving resources – through more economical concepts – not only reduces the respective expenses but also the industry‘s negative impact on the environment. Proven progress in this area has had a positive effect on the metal industry‘s image. In particular, concepts that make resource- and energy-efficiency measurable must be developed and implemented here, and appropriate target criteria must be applied. Once in use, these concepts must be developed further in terms of meaningfulness and appropriateness in order to gain knowledge based on practical experiences in cooperation with the region‘s science experts which can then serve as the basis for further dialogue. — Potential

Ongoing or past research projects in this area focus(ed) on topics such as the energy- and resource-efficient design of manufacturing methods and logistics or the reduction of emissions in production facility surroundings.

Potential project topics

- Development and implementation of analytical models to illustrate and control linked regional industrial structures (energy-intensive processing industry companies, e.g. foundries)
- Development and implementation of online measuring systems for the precise recording of the energy consumption at certain times (energy-intensive processing industry companies, e.g. foundries)
- Production resource-efficiency through the end-to-end analysis of process chains and the development of robust, efficient manufacturing technologies
- Low energy coating and joining processes - a contribution to light engineering that also focuses on material resource saving
- Development of metal-based material processing energy forecasting methods on the basis of actual production data
- Development of a simulation supported technology database in order to substitute energy-intensive processes and methods
- Development of control methods for energy-optimised production planning and control
- „Cross energy management“: In-house and cross-company design of the production and consumption sides taking all types of energy into account
- Energy production and consumption related potential analyses as a basis for regional settlement concepts (balancing production and consumption)
- „Baseload independent factory“: investigating methods and technologies that could provide a reliable baseload independent energy supply to industrial companies during shutdown periods through a combination of renewable energy and storage technologies
- Establishment of a „Green Metal“ network
- Communication of existing offers such as, for example, those provided by the Brandenburg regional government‘s Energy Saving Agency and the VDI Centre for Resource Efficiency.
- Transfer of the „Green Jobs“ project results

9 Material efficiency, recycling and recovery

Making material efficiency, recycling and recovery solution approaches available for use Objective

In the metal industry, material costs represent a major cost factor. Developing solutions for using less material, recycling material or production waste or recovering and reintroducing this waste to the material cycle reduces costs and therefore promotes the industry‘s competitiveness.

The efficient use of materials, i.e. the reduction of material losses during the production process, and also waste material recovery and recycling, is a technical and organisational challenge for the metal industry as well as an opportunity to increase its competitiveness. Relevance

Smart solutions harbour the potential for increasing productivity. Less production waste means less costs – as does the sensible reintroduction of waste and End of Life (EOL) products into the production cycle. New solution approaches can be developed, especially in tandem with material technologies, light engineering approaches, production technologies and engineering methods/design, to initiate an integrated approach. For this purpose, the individual expert disciplines must forge closer links and be guided by the innovation needs of the companies. Potential

Ongoing or past research projects in this area focus(ed) on topics such as efficient material use in various areas of application.

Potential project topics

- Reproduction strategies for the remanufacturing of high quality industrial goods or for the further use of high quality components/component groups.
- Communication of existing offers such as, for example, the offers provided by the VDI Centre for Resource Efficiency or the Federal Ministry for Economic Affairs and Energy (BMWi) „raw material and material efficiency innovation vouchers“
- Transfer of the „Green Jobs“ project results

10 Efficiency through the targeted use of modern component and process audits

Objective

Making modern component and process auditing methods available for use in order to increase process efficiency

The ideal manufacturing process would produce faultless parts and components using the optimum methods. However, in real-life manufacturing, it is necessary to constantly check the quality of the components/parts manufactured, to ensure that they are true to size and to make certain that all processes run smoothly with component and process auditing processes that are carried out as inline and as nondestructively as possible.

Faults or quality issues and their subsequent rectification are substantial time and cost factors for manufacturing companies.

Relevance

An early awareness of potential fault sources that could impact on quality allows companies to implement countermeasures in time, and helps to reduce production risks. The cluster activities in this area are aimed at accelerating the use of modern component and process auditing methods in Brandenburg in order to increase productivity and reduce the production risks.

Potential

Ongoing or past research projects in this area focus(ed) on topics such as the development of measuring and auditing methods and technologies on the basis of different technological approaches.

Potential project topics

- Development of automated, nondestructive material auditing methods on the basis of combined processes (X-ray, ultrasound)
- Development of innovative measuring and auditing methods for the nondestructive material auditing of multi-layered composite materials (automotive industry suppliers)
- Modern light engineering component auditing
- Affordable, extremely precise and contactless assembly process quality assurance and quality promoting measuring methods
- Communication of information and potential of modern component and process auditing methods Identification and consolidation of the regional R&D capacities

11 Flexible partial automation

Making modern component and process auditing methods available for use in order to increase process efficiency Objective

Flexible partial automation refers to the economical and useful automation of the production process at points where technical system solutions can deal with tasks faster, in a more replicable way and more cost-effectively than would be possible with manual processes. The concept is not aimed at replacing humans in manufacturing, but at assisting them where it makes sense.

Purely automated solutions are suitable for large-scale manufacturing processes and do not always meet the needs of medium-sized companies. Partial, flexible automated production is a solution that is economical and also has a stabilising effect on the workforce. Relevance

Using flexible automation solutions and application solutions for some production process stages allows productivity and economic viability increases to be realised with lower investment sums than complex automation systems without replacing the human workforce. This can be achieved through the exchange of best practice examples, as well as in tandem with research institutions. Application-oriented solutions must be developed by plant and equipment manufacturers and automation service providers. With the aim of gradual introduction, pragmatic automation concepts must also be developed and realised for small and medium-sized companies. Potential

Ongoing or past research projects in this area focus(ed) on topics such as components and methods for flexible and in part autonomous systems in the factories of the future.

Potential project topics

- Use of light engineering robots in the manufacturing industry and in logistics (supplier industry, mechanical engineering)
- Development of automated metal working methods for small-scale lots through flexible, robot-assisted process control
- Development and use of assistive packaging and logistics handling systems. Use of intelligent assembly robots
- Development and use of light engineering robot systems in combination with complex assembly and production tasks; for this purpose, development and use of innovative sensor-assisted workplace safety concepts and modular, adaptive gripper systems

12 Automated production related end-to-end chain of information

Objective

Realisation of an end-to-end flow of digital information in order to improve efficiency and flexibility

End-to-end chains of information are the result of the consistent, seamless digitalisation of automated and organisational business processes. At the next stage, they link planning and control processes beyond the local limits through the use of interlinked computer aided engineering (CAE) software tools that allow the revitalisation and simulation of the planning and production processes and therefore create transparency and unlock productivity advantages.

Relevance

There are currently no end-to-end digital tools in companies with automated production lines. To ensure that processes run smoothly, seamless chains of information must be realised, and standardised interfaces must be available. One particular interface is the transition from the planning stage to actual factory operations. The planning data can be used further when the production is running and reprocessed to improve the planning quality. Equally, digitised maps of the actual plant and machinery configuration can be used efficiently for new installations and equipment conversions.

One particular challenge is achieving production information reliability.

Potential

Different digital tools, missing interfaces and missing or insufficient information or data that is not being used result in wasted time and money. End-to-end digital chains of information can increase the potential here. In addition, digital models and trials lead to cost savings as they replace real test runs of tools, components or processes. The challenge lies in making the currently offered digital planning and control systems also available to small and medium-sized companies. Extensive information and qualification measures are also needed besides the respective investments.

Ongoing or past research projects in this area focus(ed) on topics such as production optimisation through the use of artificial neuronal networks.

Potential project topics

- Introduction of local data host centres to help SMEs to gain broadband internet access (SMEs, metal industry)
- Adaptive and learning setup management through incorporation of machine operator interaction
- Use and expansion of existing IT security concepts designed specifically for manufacturing and factory processes

- Designing IT security measures suitable for use in manufacturing – identifying security risks at an early stage and determining the appropriate measures to be taken
- Potential use of RFID and telematic systems to improve the identification and control of automated production and logistics processes

13 Quality assurance and quality management

Increased efforts in the area of quality assurance and management to maintain competitiveness Objective

Products, processes and services are subject to specific quality standards. This calls for quality assurance mdeasures and also for end-to-end quality management to continuously improve the quality.

Quality assurance and management are basic requirements in manufacturing. Strategies, systems and processes that contribute to quality assurance stabilise competitiveness. A more recent field in this respect is quality management at the design and planning process stage – particularly in collaborations that involve several development and planning partners. Relevance

Consistent, efficient quality assurance and actively pursued quality management throughout the entire lifecycle of the product or service ensure that anything that might have a harmful impact on quality can be identified in advance, thereby preventing plant shutdown, and guarantees that the products or services supplied to the customers meet the expected quality standard. Process appropriateness and optimisation are a major challenge in this respect. Activities by the master craftsmen‘s guilds, industry associations and further qualification institutions can help here. Potential

Ongoing or past research projects in this area focus(ed) on topics such as cross-system quality management as well as various quality assurance strategies.

Potential project topics

- Development and use of fast, digitalised 3D measuring and auditing methods that include the raw and finished part geometries, and the communication of this information to the product database and the bill of material (reverse engineering)
- Real time temperature field measuring in metal production
- Use of accreditation and certification schemes for metal-based solutions in the food industry and the food value creation chain.

14 Technologies and solutions based on metal in currently existing industries

Objective

Gaining competitive advantages through the targeted use of technologies and metal-specific application solutions

Expansion of offers, specialisation or positioning as a system provider in existing and well-established industries such as plant construction and plant systems engineering, automation technologies, handling drives and systems, machining technologies, lifting equipment and special machinery engineering, toolmaking and control systems.

Relevance

A major share of the value created by Brandenburg‘s metal industry is produced in existing industry sectors, which will remain key customers alongside the newly emerging industry sectors.

Potential

Competitive advantages must be gained in the existing application sectors alongside the application of enabling technologies, the use of new solution concepts and the use of efficiency increasing process technologies. In this respect, particularly small and medium-sized enterprises must be supported as their innovation resources can sometimes be very limited. Respective offers by the master craftsmen‘s guilds, the industry association and the R&D institutions could provide effective support.

Ongoing or past research projects in this area focus(ed) on topics such as the design of specific machines, tools and automation solutions.

Potential project topics

- Development and use of mass customisation concepts in the metal part and component consumer and capital goods industry. For this purpose, design of adapted customer configuration platforms with the aid of digital technologies
- Development of separating and joining methods for cutting tools used in the food industry

15 Role of metal in new and emerging industries

Objective

Gaining competitive advantages through the targeted use of technologies and metal-specific application solutions

Expansion of offers, specialisation or positioning as a system provider in existing and well-established industries such as plant construction and plant systems engineering, automation technologies, handling drives and systems, machining

technologies, lifting equipment and special machinery engineering, toolmaking and control systems.

A major share of the value created by Brandenburg‘s metal industry is produced in existing industry sectors, which will remain key customers alongside the newly emerging industry sectors. Relevance

Competitive advantages must be gained in the existing application sectors alongside the application of enabling technologies, the use of new solution concepts and the use of efficiency increasing process technologies. In this respect, particularly small and medium-sized enterprises must be supported as their innovation resources can sometimes be very limited. Respective offers by the master craftsmen‘s guilds, the industry association and the R&D institutions could provide effective support. Potential

Ongoing or past research projects in this area focus(ed) on topics such as the design of specific machines, tools and automation solutions.

Potential project topics

- Development and use of mass customisation concepts in the metal part and component consumer and capital goods industry. For this purpose, design of adapted customer configuration platforms with the aid of digital technologies
- Development of separating and joining methods for cutting tools used in the food industry

16 Sourcing, generation and transport of conventional energy carriers

Increased utilisation of the synergy effects with the energy sector – metal as a solution supplier as well as energy consumer Objective

Metal is an enabler for the production, transport and distribution of energy in the form of electricity, gases, liquids or heat. At the same time, the metal industry is a major energy consumer. In this area, ways must be found to design the energy supply so that it is safe and economical, e.g. through cooperative energy sourcing or in-house energy production.

The energy industry is an important customer, yet also the provider of energy services to the metal industry. The energy industry needs technologies and solutions based on metal. New ways of sourcing energy, one of the metal industry‘s largest cost factors, must be found in order to reduce costs. Relevance

The development of new metal-based technologies and solutions to meet the needs of the energy industry promises additional growth for the region‘s metal Potential

industry. Approaches must therefore be developed for making innovative offers available that emphasise the position of metal as an energy production enabler. However, when it comes to the industry‘s own energy consumption, new energy sourcing methods must also be explored in order to bring the cost factor energy down to an acceptable level.

Ongoing or past research projects in this area focus(ed) on topics such as smart load management or innovative power station technologies.

Potential project topics

- Development and use of automated separation and joining technologies for thin walled pipelines made of non-ferrous metals
- Corporate energy management for energy-intensive companies with the aim of producing a major proportion of the required energy in-house
- Development of modular pipeline systems

17 Role of metal in the production and storage of energy generated by alternative means

Objective

Developing metal further as an enabler for a sustainable energy supply

Alternative energy production, for example using photovoltaic, wind turbine, biogas or heat recovery systems, and the storage of the produced energy are topics addressed by the German national and the Brandenburg regional energy strategies. As a system and solution supplier, the metal industry can participate in their implementation.

Relevance

Germany‘s envisaged energy turnaround has created, or is currently in the process of creating, an industry that has new equipment related requirements and places specific demands on metal as a material.

Potential

The technology field of alternative energy production and storage offers a wide range of metal-based technology and solution application areas, for example light engineered structures or metals with special coating for aggressive environments in biogas production. In this area, regional as well as national and international networks harbour innovation potential that should be exploited. Development and value creation collaborations with market leaders from, for instance, Scandinavia (renewable energies) or South Korea (battery technology, battery electronics) can lead to new market services. The ultimate aim of this area of action is to expand the value creation extent in the field of renewable energies.

Ongoing or past research projects in this area focus(ed) on topics such as the optimisation of systems and components for the production of renewable energy or heat recovery.

Potential project topics

- Development of innovative resilience engineering surface coatings. The material needed for the energy turnaround must be protected from corrosive substances and high and maximum temperatures. For this purpose, further development of surface property related treatment methods such as, for example, physical vapour disposition (PVD) and chemical vapour disposition (CVD) methods and ion implantation technologies
- Corporate energy management for energy-intensive companies with the aim of producing a major proportion of the required energy in-house
- Supporting the establishment of a hydrogen infrastructure in collaboration with energy engineering stakeholders

18 Metal as an energy efficiency enabler

Systematically develop metal-based solution concepts to improve energy efficiency Objective

In this area, the focus is on the investigation, development and manufacture of metal-based technologies and solutions for energy-efficient devices and equipment as well as the outfitting of energy-efficient buildings and infrastructures.

Energy efficiency is an issue that impacts on the entire industrial landscape, both in Germany and elsewhere. The consumption and cost of energy must be reduced in order to thereby ensure the financial viability of manufacturing activities and also their environmental compatibility. Relevance

As a material and as the basis for technologies and solutions, metal has the potential to become an energy efficiency enabler – whether, for example, as a light engineering material, as a resilient material, or as a material for heat recovery systems. This potential can be unlocked especially within the scope of the key European research topics. Potential

Ongoing or past research projects in this area focus(ed) on topics such as designing energy-efficient manufacturing methods or increasing the efficiency of production systems.

Potential project topics

- Green buildings: integrating solar technology in buildings

19 Metal as a driver of sustainable transport

Objective **Development of the future market sustainable transport**

The key issue of sustainable transport includes offers in the area of alternative fuels (e.g. fuel and energy efficiency), alternative drive technologies (e.g. electric engines and energy storage) and alternative vehicle construction concepts (e.g. light engineered chassis) as well as infrastructure and traffic management.

Relevance If our future traffic is to be dominated by sustainable transport, the respective metal-based solutions and technologies must be available.

Potential Sustainable transport is a growth area where there will also be a demand for metal industry offers in future as the drive technologies change; in fact, the metal industry is of major importance here. Respective offers, such as light engineering materials or hybrid composite materials that meet the requirements of sustainable transport, must be developed and marketed. The respective regional, national and EU programmes must be utilised for this purpose. In particular, this can be achieved through concerted efforts involving the R&D centres in Brandenburg as well as in Berlin under the coordination of the Berlin Agency for Electromobility.

Ongoing or past research projects in this area focus(ed) on topics such as the integration of battery systems or the safe design of vehicle bodies.

Potential project topics

- Development and use of intermetallic phases to increase the resilience of combustion engines

20 Role of metal in mechatronics and electronics

Objective **Developing specific solutions at the points of interface with mechatronic, electronic and information system solution concepts**

Contribution of materials component and manufacturing technology solution expertise to the realisation of mechanical, electronic and mechatronic systems.

Relevance Electronic and mechatronic technologies and solutions belong to the metal industry‘s core business.

Potential Mechanics and electronics are key application areas for metal. Their progressive fusion, mechatronics, offers additional fields of application for the metal industry‘s solution expertise which the Brandenburg-based stakeholders can develop for themselves. Competitive collaborations can be established together with the Berlin-based science and business stakeholders that focus on electrical engineering.

Ongoing or past research projects in this area focus(ed) on topics such as mechatronic product design and components.

Potential project topics

- Use of bio-compatible stainless steels in pharmaceutical and medical applications (e.g. measuring and drug delivery devices)

21 Role of metal in the recycling industry and in sustainable water management

Developing new solutions in the future field of recycling and sustainable water management — Objective

Development, realisation and marketing of technologies and/or solutions that are of benefit to the recycling and water management sectors. This includes waste collection, transport, recycling and disposal and also environmental rehabilitation, as well as water catchment and treatment, the water supply and also using water in a more efficient way.

Sustainability and environmental protection are issues of increasing relevance. Reusing previously processed raw materials and consumables as well as less water consumption and preventing water pollution helps to reduce the negative impacts on the environment or can avoid these altogether. — Relevance

Waste that is not produced in the first place or used further and water that is not consumed or polluted improve both a company's environmental performance and costs, as well as the image of the metal industry when it comes to environmental protection. Precautionary measures and process adaptations aimed at these objectives, including cooperative activities, should be accelerated and supported by the cluster. Ongoing or past research projects in this area focus(ed) on topics such as potable water protection. — Potential

Initiating Innovations

22 Initiating innovations

Supporting corporate innovation activities – establishing the region's already well-grounded innovativeness long term — Objective

Innovativeness means successfully realising product, process, service or business model innovations in a financially viable way. Primarily, this depends on a stakeholder's innovation-focused mentality and capacity. Guided by an innovation strategy, innovations can be initiated through appropriate innovation management and networking with national and international experts and key players in

order to drive value creation. Companies must make additional efforts to permanently implement innovations in the industry, and some new supplier chains must be developed.

Relevance Innovations ensure and increase value creation. They have a positive impact within the company, and also on the external company image.

Potential Innovations offer the potential for staying ahead of the competition, generating additional value creation and maintaining or increasing the workforce numbers. In this respect, companies can benefit particularly from cluster activities that can offer not only information about innovations developed by scientists but also support when it comes to the coordination and interlinking of innovation activities. Companies that intend to develop and realise innovations with stakeholders from other industries and countries will also be supported. Another starting point is the development of a regional innovation system and supporting structures for SMEs that, for example, counteract the current difficulties when it comes to technology transfer between universities and SMEs yet also help to proactively focus on future industrial production trends and to translate the acquired knowledge into industrial innovations in the form of an innovative product or process.

Ongoing or past research projects in this area focus(ed) on topics such as innovative lean concepts. In addition, numerous innovation promoting measures have been supported in the past and continue to be supported.

Potential project topics

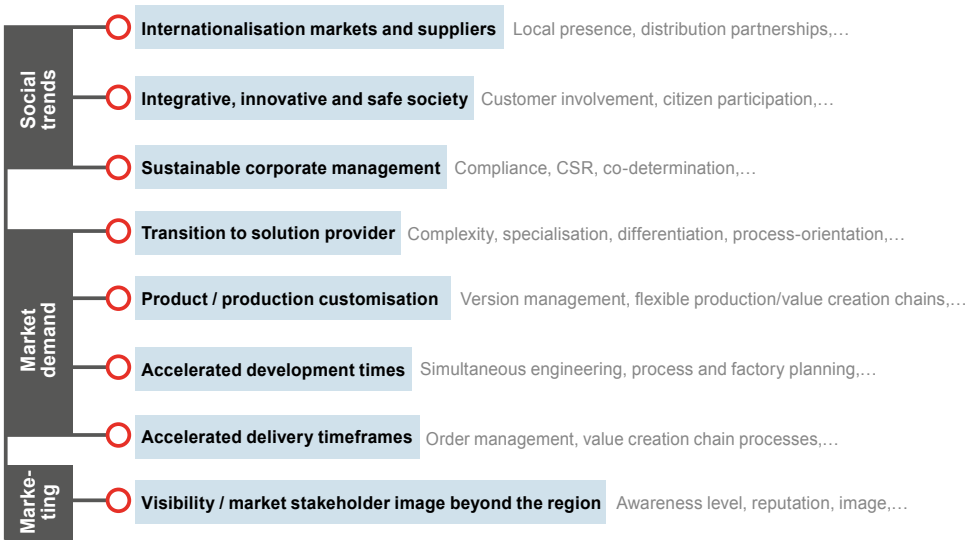
- Innovation management advice, e.g. on how to finance and successfully market innovations
- Evaluation tools to determine the financial viability of new production management technologies and methods in detail
- Mapping exercises and workshops to raise the medium-sized companies‘ respective awareness
- Supporting investments
- Supporting customer- and supplier-driven innovations in SMEs
- Active and leading involvement in the design and establishment of supporter structures for modern Industry 4.0 in Brandenburg

3.2 Brandenburg Metal Industry Collaboration Network

Area of action profile

There are many different kinds of collaborations between companies or between companies and research institutions. Their common interest is finding solutions to challenges on the basis of their complementing expertise. These can be all sorts of challenges – external, social trends, market demand or market presence related. For that reason, the area of action Brandenburg Metal Industry „Brandenburg Metal Industry Collaboration Network“ is divided into the sections „Social trends“, „Market demand“ and „Marketing“.

Chart 10: Area of action „Brandenburg Metal Industry Collaboration Network“ drivers



Area of action objectives

The objectives of this area of action are promotion of the dialogue between the cluster stakeholders and networking beyond the region to encourage more interaction. This facilitates the completion and extension of the region‘s value creation chains to improve the competitiveness of the local companies. Disseminators from the business and scientific communities and local governments must act with an awareness of shared objective matrixes. Another aim is the establishment of direct and less time-consuming supplier networks. In addition, joint marketing and public relations measures would promote the general awareness of the services offered by the cluster stakeholders and create an image of the region‘s metal industry.

Cornerstones

The area of action‘s eight key issues can be allocated to the following five cornerstones:

- Marketing and public relations,
- Communication and knowledge transfer,
- Interactive collaboration,
- Local value creation and development networks and
- Metal Cluster identity

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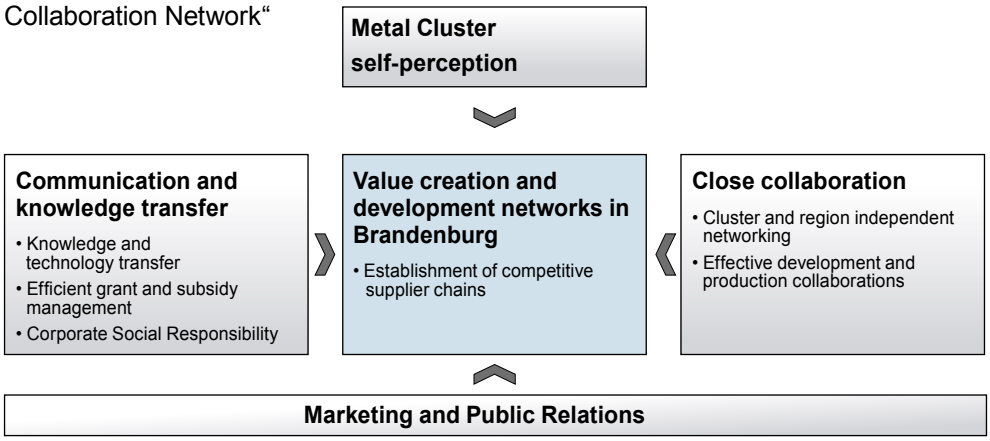
Chart 11: Cornerstones of the area of action „Brandenburg Metal Industry Collaboration Network“



Prerequisites for collaborations are visible stakeholders whose services, offers and requirements are transparent, and information about research and funding related support offers. This can generally be achieved with marketing measures. The objective is to close the existing gaps in the value creation and development process chain – ideally with stakeholders from Brandenburg and the neighbouring regions. The basis for this is establishing confidence in the success of co-operative activities. Acting jointly in the Metal Cluster will promote this confidence, not least through the development of a „Metal Cluster Brandenburg“ identity.

Marketing and Public Relations

23 Marketing and public relations

Objective **Heightening the metal industry‘s profile and strengthening its presence beyond the regional borders**

The cluster‘s marketing and PR activities are twofold: on the one hand, the companies promote themselves with the aim of increasing their profile and sales, networking and recruiting qualified workers, and on the other, there are marketing activities to promote the Metal Cluster Brandenburg as a whole – as a cluster with capable, innovative companies as well as future-focused research institutions and also as a location that offers excellent education, training and employment opportunities.

Relevance

Profile and image are two factors of major relevance to companies and research institutions when it comes to their business or research activities. However, smaller companies can often not manage the associated expenses and efforts on their own. A positive, image across all sectors and clusters is therefore of particular importance to these companies.

Potential

A cluster supported initiative to heighten the profile and the positive image of the Brandenburg metal industry nationally and internationally can promote sales and cooperative efforts, attract additional value creation to the region and have a positive impact on the qualified workforce situation. Parallel efforts by the cluster also help to raise and increase the public awareness of the market presence of the cluster‘s stakeholders – on the international markets too.

Potential project topics

- Supporting the PR efforts of companies to increase the awareness level in general, and to promote networking and employer marketing campaigns Development of an online map of expertise for the Brandenburg metal industry
- Establishing a (national and EU-wide) image with the aim of presenting the metal industry as an attractive and capable customer and employer. Joint national and international trade fair attendance by networks, companies and scientists including B2B and C2C offers. Completion of marketing materials, e.g. cluster websites in English
- Use of public media throughout the region (radio and TV, press, internet) to highlight successful examples and for the publication of cluster reports
- National and international presentation of the cluster and its activities by cluster stakeholders from the business and the scientific communities and metal networks
- Promoting event formats designed for schoolchildren, university students and the interested public
- Positioning the metal industry as befits its relevance at industrial events organised by the Brandenburg regional government
- Representing the interests of the cluster throughout Europe to strengthen its position

24 Establishing competitive and flexible supply chains

Objective **Establishing and strengthening competitive and flexible supply chains**

Changing markets impact on what is expected of supplier chains. To meet these expectations, supplier chains must be agile and flexible, yet also reliably financially viable and capable. An awareness of the expertise that is available in the region contributes to this as much as promoting value creation networks within the cluster and the region, and also on a national and international level. Identifying and if necessary closing existing value creation gaps also contributes to this.

Relevance Changing markets and increasing customer expectations are factors companies must address and resolve to maintain their position in the market.

Potential Being able to respond fast and flexibly to changes increases the competitiveness of companies and ensures their future positive development. The company saves valuable time if it can draw on regional value creation networks for this. Companies must be put in a position that allows them to also build up capable supply chains within the region. In this context, the region must establish the necessary preconditions through the targeted reduction of value creation gaps.

Ongoing and past collaborative projects in this area focus(ed) on topics such as the optimisation of production and logistics processes.

Potential project topics

- Identification of typical value creation chains and the subsequent analysis of existing value creation gaps. Conducting a study to identify the value creation gaps and measures for closing these
- The cluster stakeholders must actively encourage vital value creation partners to settle in the region. Active and focused measures to encourage businesses to settle here. Exploitation of synergies within Brandenburg‘s business development agency
- Offer of regional activities to encourage networking, such as regular business community meetings
- Helping businesses to become established here with measures for start--ups and measures that encourage businesses to choose Brandenburg as a location

25 Cluster and region independent networks

Objective

Systematically making the potential harboured by cross-cluster and cross-regional networking available and promoting regional networks and initiatives

To guarantee and increase the innovation capability of metal companies in the region, business and scientific community stakeholders and business development agencies must pursue networking activities beyond the borders of Brandenburg, clusters, regions and industry sectors.

Relevance

The availability of new knowledge for new solutions is a fundamental requirement for company efficiency.

Potential

Networking makes it possible to learn from each other, to exchange knowledge, and to jointly develop and realise ideas. Stakeholder networking beyond all borders can also contribute to increasing the R&D intensity in Brandenburg's companies. At an international level, intensified networking also allows the development of international markets. Structures and formats must therefore be established or strengthened that support these networking efforts, from arranging first contact to joint activities.

Ongoing and past activities in this area focus(ed) on topics such as the establishment of „metal communities" or organisational structures.

Potential project topics

- Content/topic related joint events and initiatives with other clusters
- Involvement of Regional Core Growth areas in networking activities
- Involvement in the evaluation of cross-cluster activities
- Supporting the national and international collaborations of local metal stakeholders
- Initiating contacts beyond the region's borders with a particular focus on Central Germany
- Supporting new networks and initiatives as well as developing new syn ergies with existing networks
- Identifying the internationalisation needs of the cluster stakeholders
- Ensuring the cluster's long-term performance capability

26 Efficient development and production collaboration

Objective

Initiating and promoting new and existing development and production collaborations

Development and production collaborations promote the joint generation of ideas and innovations in the form of products, processes or services by several companies with different skills or in cooperation with research institutions, although their purpose may also be joint production. The cluster can serve as a platform for the initiation of collaborations or their organisation.

Relevance

Collaborations strengthen the participating stakeholders. New ideas and innovations result from the contribution of different skills to a collaborative effort. Production collaborations make up for a lack of production capacities or technologies.

Potential

Companies can strengthen their position on the market and achieve additional value creation through innovations. Collaborations make it possible to come up with and to realise ideas, and thereby also contribute to increasing the research and development intensity in Brandenburg‘s companies. However, the local businesses do not always have the necessary capacities or expertise. The initiation and realisation of cooperative collaborations between companies as well as between the region‘s companies and research institutions must therefore be promoted.

Potential project topics

- Optimum matching of existing qualified advice offers and supporting the transfer of best practice examples and experience-based knowledge to initiate and set up development and production collaborations
- Pre-competitive communication between companies to come up with ideas

Communication and Knowledge Transfer

27 Knowledge and technology transfer

Objective

Further development and systemisation of efficient knowledge and technology transfer between the stakeholders in the Metal Cluster and related industry sectors

Knowledge and technologies can develop their full impact if companies can translate them into value creation. However, they must meet the requirements of the companies and the market if they are to be utilised and seamlessly realised in manufacturing. The gaps between supply and demand, between research institutions and businesses, must be closed. In addition, knowledge that benefits the industry as a whole must be identified and adapted.

New knowledge and new technologies are fertile ground for new value creation. What is important is that they meet the needs of the companies, are created in a market-appropriate way and that the companies are interested in them. The business and the scientific communities must therefore communicate even at the earliest stages of research and development. Relevance

Knowledge and technology transfer cannot develop its full potential until the knowledge and technology creation process is in line with the company and market requirements. Companies as well as research institutions must be encouraged to find each other, to identify their respective needs and to develop solution approaches. Potential

Potential project topics

- Supporting corporate knowledge management through practical application oriented Bachelor‘s and Master‘s theses
- Promoting the knowledge exchange between metal network member companies through consultation of external experts Division of labour based collaborations and the exchange of information between the management of local and industry networks and the cluster management
- Collaboration agreement between ZAB and metal industry networks
- Expansion of the cluster management cooperation with the organisers of the „metall IT“ trade fair with the aim of knowledge transfer on the subject of IT applications for metal industry companies

28 Commitment to efficient grant and subsidy management

Expansion and optimisation of business-oriented funding management Objective

Funding promotes the development of the economic and research landscape as well as the maintenance of a qualified workforce and improves the chances of employment. Funding is aimed at reducing obstacles that hinder further development, especially those faced by small and medium-sized enterprises. At the same time, however, it is particularly the small companies that are often reluctant to make use of the funding on offer. Identifying suitable funding programmes, submitting correct, successful applications and accounting for the funds received represent serious obstacles in terms of administration, especially for small and microenterprises. These hurdles can be overcome with professional funding advice and support during the application process.

Funding can develop its promoting effect on businesses only if these make use of it. Just as important is that funding programmes are consistent as this promotes their transparency and reliability and therefore the demand for them. Relevance

Potential

Efficient and transparent funding management with reduced bureaucratic elements when it comes applying for funding and the processing of funding applications and promotes innovations throughout, i.e. also beyond prototype realisation, can give the business community additional impulses that can also have more impact on small and medium-sized enterprises. This can be achieved if more companies can draw on positive experiences and are supported with information.

Potential project topics

- Providing highly qualified funding advice to Brandenburg's metal companies, in particular also about new financial instruments. Lobbying for user-friendly, less bureaucratic funding

29 The Brandenburg metal industry and corporate social responsibility

Objective

Supporting the economy stakeholders when it comes to corporate social responsibility and improving their environmental performance

Corporate social responsibility (CSR) is a term used to describe the need for companies to be aware of their social responsibilities as they pursue their business. It relates to voluntary standards which a business sets itself with regard to compliance with the legal regulations and the company rules when it comes to corporate practices, environmental issues and its employees. Frequently, it also expects its suppliers to comply with these. The automotive industry is leading in this respect. The Metal Cluster could offer support when it comes to helping companies to implement such standards or to draw up their own CSR standards, or could develop CSR standards which the entire cluster subscribes to.

With systematic environmental management – for example participation in EMAS, the European Eco-Management and Audit Scheme – or energy management in accordance with the ISO 50001 standard, companies can comply with the increasingly stringent environmental and climate protection requirements and can credibly convince the public, consumers and customers of this commitment as it is documented.

Relevance

Compliance with CSR standards, the introduction of environmental and energy management systems and furnishing the respective proof is a challenge for companies, especially small and medium-sized enterprises, when they put in a tender as a potential supplier. It takes time, organisational effort and money. Support in the form of information and help with the organisational aspects provided by the cluster can reduce the extent of effort and money required. Another suitable supporting element could be the establishment of a uniform, standardised CSR brand for the Brandenburg Metal Cluster.

Potential

Simpler implementation of CSR requirements and a joint commitment to clus-

ter-internal standards help the companies (especially if company executives, the workforce and works councils all participate in their design) and strengthen Brandenburg as a business location – including its image. Linking EMAS, ISO 50001 and CSR may also make it possible to use synergies and to reduce the requisite effort.

Potential project topics

- Integration of the issues CSR, environmental and energy management in activities and events. Focusing on their economic relevance (marketing factor for individual business and clusters, sustainable business management, qualified workforce recruitment) and communicating this information
- Increasing the incentives for the introduction of environmental and energy management systems (e.g. through financial support during the introduction phase, advice offers, privileges and concessions during the implementation of the legal regulations)
- Encouraging works councils and works council networks to talk to each other about their experiences with CSR as well as environmental and energy management
- Establishment of a uniform, standardised CSR brand for the Brandenburg Metal Cluster (for example based on the ISO 26000 standard)

Metal Cluster Identity

30 Perception of identity: „The metal industry, a key player in Brandenburg‘s economy“

Objective

Establish a common cluster stakeholder identity as a strong value creation community

The Brandenburg metal industry is the traditional backbone of the region. It is the biggest key player in Brandenburg‘s economy, can draw on the capital region‘s excellent research landscape and is a modern and attractive employer.

Relevance

Establishing a common cluster and cluster stakeholder identity as a strong value creation community with tradition strengthens the solidarity within the cluster and the industry, and has a positive impact on how the cluster is perceived externally.

Potential

A common metal industry self-perception promotes the feeling of belonging to a value creation community that identifies strongly with the region, and the presentation of an external image as a provider of innovative solutions.

Potential project topics

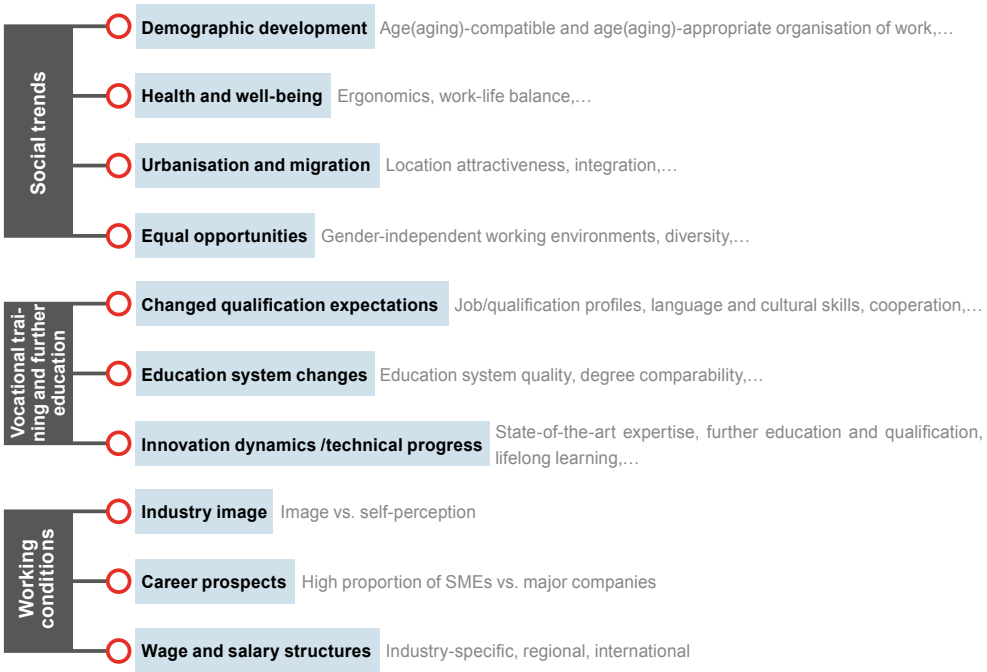
- Gaining companies as cooperation partners in local or metal industry networks
- Identification with the metal cluster initiative
- Meeting the extensive need for explanation of the „cluster“ concept with stakeholder-appropriate information
- Internal and external communication of the industry and location advantages
- Advertising and participating in the regional government‘s cluster strategy related marketing activities

3.3 Brandenburg Metal Industry Qualified Workforce Matrix

Area of action profile

A qualified workforce is the basis of all productivity; this also applies to companies and research institutions in the metal area. Qualifications offer people the chance to use their potential and to get on in their career. Suitable, efficient framework conditions that are guided by the needs of the employees, the employers and global trends are necessary to allow people to gain qualifications. To provide a framework for sector-specific support, the key issues identified in the area of action „Qualified workforce matrix Metal Cluster Brandenburg“ have been divided into the three categories „Social trends“, „Vocational training and further qualification“ and „Employment conditions“.

Chart 12: Area of action „Brandenburg Metal Industry Qualified Workforce Matrix“ drivers



Area of action objectives

This area of action is aimed at helping to design the vocational training and further qualification conditions in a way that meets the interests of the companies and research institutions and also those of the education and training providers, and benefits both. Young people must be made aware of their various future career options, and the respective education opportunities must be on offer to enable them to become qualified members of the workforce. It must be made easier for the unemployed to find gainful employment again. At the same time, companies must be supported when it comes to the recruitment, retention and targeted further training of suitably qualified employees. The basis for success in this area are high quality, available and comparable education offers that are guided by

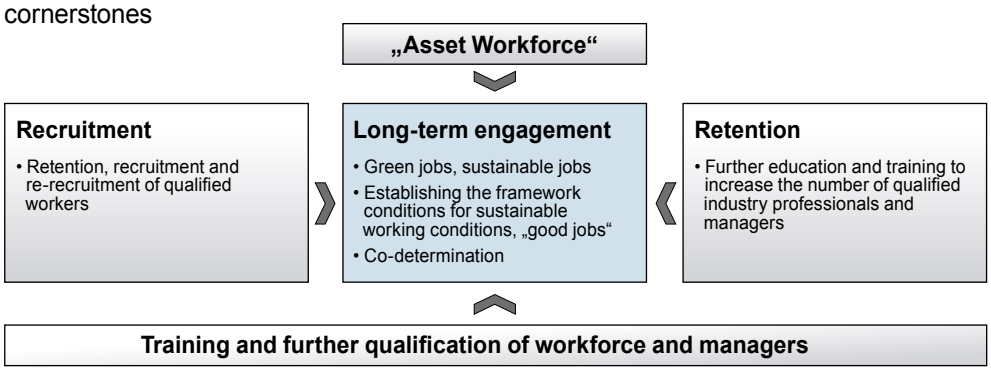
the needs of the business and the scientific communities, do not ignore the realities the young adults, the unemployed and the qualified workers are faced with and use modern methods for effective learning processes. The objective here is to provide direct support and advice on how to implement measures in this area of action in close cooperation with the region's established stakeholders, e.g. through advice and jointly raising the profile of sector-specific events

Cornerstones

The area of action's eight key issues can be allocated to the following five cornerstones:

- Training and further qualification of workforce and managers,
- recruitment,
- workforce retention,
- long-term engagement of workforce and
- „asset workforce"

Chart 13: Area of action „Brandenburg Metal Industry Qualified Workforce Matrix" cornerstones



For the stakeholders from the business and scientific communities, initial vocational or professional qualification is a fundamental key issue. The basis for competitiveness and a secure future must be established here with activities aimed at ensuring and improving the vocational and professional training of workers and managers. In line with the key objectives of personnel management, employee recruitment and retention measures ensure that a company can continue to operate successfully and thereby its survival in the long-term. Issues related to retaining and engaging the workforce long-term and the respective measures have therefore been designated a priority in the master plan. In this respect, employment opportunities in the context of sustainable products and services and the establishment of a framework for employment conditions that encourage long-term employee commitment, for example, are in the interest of the cluster. This can only be successfully achieved in the context of the realisation that the workforce must be viewed as an asset, and that co-determination must become an accepted and integrative part of the corporate culture.

31 Training and further qualification of workforce and managers

Ensuring the availability of suitably qualified workers and managers Objective

For companies and universities, vocational and professional training is the basis for financial success and scientific excellence. Suitable, practical application focused education and training is therefore particularly important for Brandenburg as a business location. Young people must be given information about the working world, newly emerging career options, the various different training and education alternatives and the respective requirements early on, whilst still at school. They also need support during the decision-making process. By cooperating with schools, companies can interest male and female young people in a career in the metal sector and recruit them at an early stage, e.g. through open days or work placements. However, the regional government must also ensure that the dual education system institutions have the capacities needed throughout the region, and that the commuting distances are acceptable. Disadvantaged young people and those with atypical biographies must also be given access with special vocational training formats and other measures to create career opportunities that allow them to become productively integrated into the employment process. For example, the transition into regular employment can be supported with financial instruments such as offering companies subsidies.

Relevance

If too few young people are trained or do not receive the kind of vocational training that is needed, there will be no future research and production. Some sectors of the industry are already experiencing a shortage of suitably qualified, specialised workers, for example automation technicians. As an increasing number of qualified workers and managers are due to retire in the next few years, the situation will get worse. In view of these framework conditions, a targeted and needs-oriented vocational training and education strategy for dual education institutions and universities is of particular importance for the region.

Potential

However, the increasingly fierce competition when it comes to recruiting qualified workers can be met with additional training and education efforts and strategies, and also by exploring new ways of getting young people interested in a career in the metal industry. New ideas and new career opportunities can make a difference.

Ongoing and past activities in this area focus(ed) on topics such as the promotion of education and training that utilises modern, mobile technologies or robots.

Potential project topics

- Definition of skills requirements for future employment opportunities, as well as advice Comparison of the skills needed with the present university offers
- Qualified workforce development in administrative districts with weak structures within the scope of joint metal industry training, recruitment through targeted initial vocational training and the recruitment of those who have left the industry
- Expand the dual education system offers and develop them in accordance with the new requirements
- Supporting companies that provide practical vocational training, potentially in combination with joint metal industry training offers or additional qualifications (e.g. marketing, subsidies, tax rebates etc.)
- Vocational and further training offers for specific employment market target groups in relevant occupations (long-term unemployed, single parents etc.)
- Ensuring that careers in the metal/electronics industries are highlighted as befits their importance in career guidance and university education activities
- Expansion and extension of needs-oriented dual education degree courses
- Interesting future students in studying for careers in the metal industry. Highlighting and supporting career guidance offers, for example through initiating joint efforts together with the Brandenburg network responsible for collaborations between schools, universities and businesses.
- Development and implementation of accompanying, target-group specific advice and coaching measures for future university students at the career guidance stage
- Development and implementation of a „Studium General“ general studies course to optimise employability
- mprovement of university product marketing
- Encouraging young people to study for university education based professions in the „MINT“ (Mathematics, IT, Sciences and Technology) fields
- Ensuring that metal industry issues are taken on board by the „Bündnis für Fachkräftesicherung“, the regional government alliance for the recruitment and retention of qualified workers

32 Retaining, gaining and re-recruiting qualified professionals

Objective

Helping metal industry companies to create attractive employment opportunities and conditions

The impending and in parts already existing shortage of qualified workers, especially in the so-called MINT fields (Mathematics, IT, Sciences and Technology), is a major challenge for the metal industry stakeholders. Various strategies and measures such as needs-oriented and flexible vocational training and education offers, improved qualified employee matching, the integration of the long-term unemployed or adapting employment conditions to meet the needs of the 55+ generation as well as Generation Y[24] must be developed further and implemented to counteract this trend and to ensure the continued productivity and operation capacity of businesses and research institutions. Answers must be found to the questions of how to retain qualified workers, how to recruit them and how to motivate qualified workers who have left the region to return here. The regional government's „Maßnahmenplan zur Fachkräftesicherung im Land Brandenburg" action plan for qualified workforce improvement can serve as one of the sources of inspiration in this respect[25].

Relevance

The metal industry stakeholders in the region are already experiencing the impact of the shortage of suitably qualified workers. This trend will continue for the time being, and will affect them even more in future. To counteract this trend, coordinated action from all sides and at all levels is a must.

Potential

Retaining, recruiting or re-recruiting qualified workers strengthens productivity and ensures the industry's operational capacity. Young people of both genders must be encouraged to consider careers in the metal industry; the long-term unemployed must be integrated and older employees must enjoy employment conditions that allow them to continue to work until they reach retirement age. The recruitment of qualified workers should also be extended internationally.

Ongoing and past activities in this area focus(ed) on topics such as matching secondary school students with companies, and providing support during the transition into working life. In addition, several „Brandenburg scholarships" have also been awarded to companies in the metal industry.

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[24] *In sociology, the generation that has grown up with the internet and mobile communication media and is therefore generally characterised as familiar with digital and electronic technology.*

[25] *Brandenburg regional government ministry for employment, social services, women and families (Ministerium für Arbeit, Soziales, Frauen und Familie, MASF) [23.04.2012]: „Maßnahmenplan zur Fachkräftesicherung im Land Brandenburg", online URL: http://www.masf.brandenburg.de/media_fast/4055/ 23_04_12_Ma%C3%9Fnahmenplan.pdf.*

Potential project topics

- Raising the companies‘ awareness of demographic management, further qualification planning and lifelong learning. Development and implementation of age or life-stage appropriate personnel development models
- (Both) SMEs and the universities in Brandenburg are still reluctant to approach each other; this reluctance must gradually be reduced through communication and cooperation
- Individual information and advice in line with the current requirements of the metal industry companies
- Motivating metal companies to nominate subjects for internship final exams and degree theses with the aim of recruiting qualified workers for the companies
- „Experience transfer“ to recruit qualified workers/increase the quota of Brandenburg university graduates who remain in the region through attractive working conditions (monetary and non-monetary, qualitative and quantitative, conditions in the company and in the company environment) that appeal to people from different age groups and backgrounds
- Improved qualified personnel matching through the university career services staff
- Regional marketing for Brandenburg‘s local metal industry aimed at school leavers and university graduates, young adults, families and people originally from Brandenburg who have left the region. Investigati on of collaboration opportunities with Polish regions
- Guidance/integration offers for specific employment market target groups in relevant occupations (long-term unemployed, single parents etc.)
- Lowering the barriers between dual education degree and academic degree courses or universities and universities of applied science, respectively, key aspect: mutual recognition of proven expertise
- Development and further development of needs-oriented further qualification offers
- Mentoring programmes for qualified workers and managers to improve career development

33 The role of further education in increasing the number of qualified industry professionals and managers

Increasing the demand for practical application oriented further qualification offers Objective

Further qualification means extending the range of knowledge and expertise, becoming more expert at something or bringing skills and knowledge up to date. Further qualification offers qualified workers and managers the chance for personal development regardless of age in order to acquire skills, and thereby additional assets, that both the employee and the company benefit from. Increasing the demand for further qualification is a key task and calls for transparent information about further qualification opportunities and their financial support. Further qualification is also important for unemployed and long-term unemployed qualified workers as well as people with insufficient qualifications. To facilitate their integration, education and qualification opportunities that meet the requirements of the local businesses must be created or made more permanent.

The acquisition of knowledge and skills is a fundamental requirement and precondition for personal and corporate development. Relevance

Further technical, organisational or managerial training for qualified workers and managers allows them to adapt to new technical developments and market conditions. Potential

Potential project topics

- Increasing the awareness of the economic relevance of further technical, organisational or management training, at the company as well as at the workforce and management level
- Development of equipment and process concepts for technology-aided learning in SMEs (on-the-job training) Use of innovative visualisation and augmented reality methods
- Development of innovative, practical application appropriate human-machine interfaces to improve the understanding and visualisation of rapidly changing equipment and operational situations
- Implementation of measures for new university education target groups such as older people, migrants, people who want to gain additional, different qualifications at a later stage in their lives
- Communicate a realistic image of professionals with academic qualifications (Bachelor‘s, Master‘s) to SMEs
- Integration of qualified academics from abroad through adaptation of the further qualification offers at universities
- Promotion in medium-sized companies: initiate and institutionalise excellence tandems

- Encouraging the will to gain further qualifications in companies, for example through „lifelong-learning-accounts“ or recognising an employee‘s commitment to personal and career development
- Capital region metal and electronics industry network expert forums that focus on current manufacturing and production, sourcing and sales and also personnel and financial issues

34 Succession planning (management and employees)

Objective

Supporting the communication of information related to succession planning

Due to an imminent generation change, small and medium-sized companies are increasingly faced with succession issues, both in terms of their workforce as well as in terms of the company management. In both cases, the handover process must be initiated in good time. Qualified candidates are not always available to fill vacancies; it is therefore necessary to accelerate skills adjustment with training and coaching measures. Furthermore, when it comes to company management, legal and organisational aspects also play a role in succession issues; it can sometimes take years to sort these out. It is therefore necessary to address the issue in good time and to assist the companies with respect to these issues. In addition, SMEs also often do not have any emergency cover plans in place.

Relevance

For many small businesses, employee and company management succession planning is an urgent problem that will also affect an increasing number of companies over the next few years. For this reason, solution strategies must be developed and implemented to ensure the continued operation and productivity of these businesses.

Potential

Companies and jobs must be safe. Clever solution strategies and advice offers help to make the region‘s business and employment landscape more permanent.

Potential project topics

- Advertising existing offers, also at a non-regional level, that provide help with corporate succession issues and raising the awareness of the necessity to act in good time

35 Green jobs

Expansion and promotion of sustainable working

Objective

„Green jobs“ refers to adding social and ecological components to job profiles, working conditions and the way work is organised. This encompasses the acquisition of technical, ecological and also cultural skills aimed at ensuring that business activities take the current ecological and industrial changes on board.

Relevance

So-called „green jobs“ raise the employees‘ awareness of issues such as material efficiency, energy efficiency and process efficiency as well as new corporate culture expectations, issues that are also of increasing importance in the metal industry, in order to be prepared for the current and future social, ecological and economic challenges.

Potential

The advancing ecological and industrial changes call for measures that allow economy stakeholders to adapt to the new conditions and to make an active and useful contribution to these changes. Sustainable working practices, realised for example through competent qualified workers with a special awareness of ecological and social issues, make it possible to maintain or if necessary improve competitiveness at a time when the conditions are changing. Sustainability aspects are also increasingly a criterion for young people when choosing their future employer or place of work. The cluster intends to promote the introduction of sustainable working practices and to advise companies on their implementation to ensure that the future challenges can be met with the respective expertise.

Potential project topics

- Utilising knowledge and best practice „green job“ examples from SMEs throughout Europe
- Developing and trialling modular further qualification and training concepts specifically designed according to the needs of companies in Brandenburg for „green jobs“ in the metal industry
- Transfer of the „Green Jobs in the Metal Industry“ project results to the Metal Cluster and also to other manufacturing industry sectors

36 Establishing the framework conditions for a working environment that is attractive in the long term - „good jobs“

Objective

Increasing the proportion of metal industry companies that offer good working conditions

„A working environment that is attractive in the long term“ includes aspects such as working times, remuneration, occupational health and safety or workplace health promotion, equal opportunities, family friendliness and a good work-life balance. Offering „good jobs“ also means adapting the corporate culture and management practices as well as the working structures and ensuring that the work is (age) appropriate.

Relevance

Offering a „good job“ or a working environment that is attractive in the long term is an extensive subject area that is relevant to companies of all sizes. It therefore calls for the use of various instruments that make it possible to adapt the conditions to the varying needs of the workforce. Applying these instruments successfully results in „good jobs“ and therefore in „good work“. This can also make the work more attractive for qualified workers.

Potential

Establishing a working environment that is attractive in the long term is a line of action that makes it possible to counteract the imminent risk of a shortage of qualified workers by improving the attractiveness of jobs and thereby also increasing productivity, competitiveness and employer appeal.

Ongoing and past activities in this area focus(ed) on topics such as workplace health promotion.

Potential project topics

- Advice on and communication of work-life balance related offers
- Workplace health promotion in SMEs
- Knowledge and experience transfer with respect to „good jobs“ and how to establish a working environment that is attractive in the long term, social innovations and corporate social responsibility
- Highlighting the connection between „good jobs“, qualified workforce recruitment and retention and also the economic relevance of „goods jobs“ as an essential element of CSR
- Ensuring that metal industry related issues are represented in the „Good Jobs“ social partnership dialogue and are embedded in the industry policy
- Individual information and advice in line with the current requirements of the metal industry companies

37 Workforce co-determination

Support with communicating workforce co-determination related information and advice to the employees as well as providing information and advice on this subject to employers

Objective

In Germany, workforce co-determination is regulated by the Betriebsverfassungsgesetz (BetrVG, German industrial relations act) and should be practiced and implemented in accordance with these regulations. However, even in companies that are exempt from these regulations, the employees should be permitted to have their say when it comes to the working conditions and processes in order establish a corporate culture that is as attractive as possible.

Relevance

On the employee side, there is a growing interest in becoming actively involved in specific aspects of everyday working practices in order to be able to adapt the working process to a way that meets the own needs better, but also in order to contribute some potential improvements to the process. Together with the employers‘ interest in increasing the performance level and motivation of their employees, and also in increasing the attractiveness of the jobs offered, working practices can be co-designed in a way that meets the employers‘ interests.

Potential

The chance to co-design the working conditions and operational processes promotes employee satisfaction, strengthens the workforce‘s commitment to the company and ultimately also increases productivity and the willingness to go that extra mile for their employer. Companies must be enabled to make use of these effects. The cluster‘s goal in this respect is therefore to provide information about the different ways employees can become more closely involved, to offer advice when it comes to implementing these methods, to share experiences and to lobby for the promotion of co-determination opportunities on the basis of a common ground.

„Asset Workforce“

38 „Asset Workforce“

Communication of information and support offers

Objective

Recognising and appreciating the workforce as an asset – beyond the corporate management approach of seeing employees merely as „human capital“. The starting point here and also one of the key aspects is an open-minded corporate culture that takes note of the employee needs, understands these and considers them. Further aspects, for example, are an appreciation of skills, dedication and

performance as well as the highlighting of personal development opportunities.

Relevance Considering employees an asset and demonstrating this is one element of the corporate culture that contributes to employee retention and recruitment.

Potential Employees who are seen as an asset can develop their potential better and thereby increase the company‘s productivity and contribute to its financial stability.

Potential project topics

- Information, further training and advice for company executives as well as human resource manages in Brandenburg‘s metal industry companies
- Development of incentive schemes that compensate for a lack of vertical career development opportunities: advice and development of ideal typical career paths

Summary

In the Metal Cluster Brandenburg, the business and scientific communities, the business development agencies, the master craftsmen guilds, the education providers, the industry associations and the policy makers and local government institutions maintain very close links. Their common goal is to promote the innovative drive in Brandenburg-based companies from the metal, electronics and mechanical engineering industries as one of the region‘s industrial backbones and to increase their competitiveness with an awareness of shared objective matrixes. In this respect, systematically closing and extending the value creation chains in the metal processing industry and encouraging intelligent specialisation are primary objectives. One result of past experiences is the realisation „We‘re strong on our own – but even stronger together“; the cluster thrives on the ideas and activities of all of its stakeholders.

This master plan, the cluster‘s strategy paper, has been drawn up over eight months. It is the result of a participative process. The 38 key issues it covers reflect the priority areas of action from the perspective of all of the cluster‘s stakeholder groups. The master plan covers three areas of action. The area of action „Innovation workshop“ addresses both material- and manufacturing- oriented issues as well as new services and solution concepts, issues related to efficiency and sustainability and new areas of application for metal-based solutions. The area of action „Collaboration Network“ focuses on stakeholder visibility aspects, the identity of the Brandenburg metal industry and on aspects related to the exchange of information, knowledge and best practice examples. The overall objective is to close the gaps in the value creation and development process chain. The area of action „Qualified workforce matrix“ covers the vocational training, education and further qualification of the workforce and managers, as well as their retention, recruitment and re-recruitment. It also addresses issues and measures for long-term employee engagement and sustainable working conditions. Internationalisation is an integrative issue that impacts on all three of the master plan‘s areas of action.

To highlight their benefits, the key issues in the three areas of action can be categorised into „Strengthening strengths“, „Keeping up“ and „New options“. This makes it clear what must in fact be done in each of the areas of action. The category „Strengthening strengths“ includes key issues where a solid foundation of expertise already exists that must be highlighted further. In the category „Keeping up“, the key issues highlight areas that call for development and urgent action when it comes to developing existing expertise further in line with the current requirements. The last category, „New options“, contains key issues for which considerable market opportunities have been forecast in the long term. These are the future-related issues in which existing expertise approaches must be systematically developed in order to be able to produce additional value creation.

Chart 14: Profile of the key issues in the area of action „Innovation Workshop“

Strengthening strengths	Keeping up	New options
Expansion of existing expertise.	Vital development need. Further development of current basic expertise.	Considerable market opportunities in the long term. Further development of current basic expertise.

Innovation Workshop

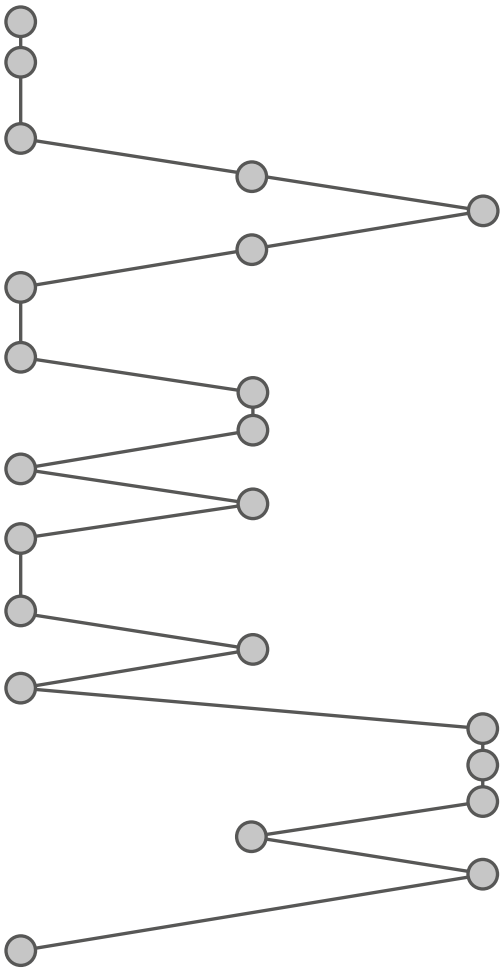
Enabling technologies
- Gaining and utilising materials technology knowledge
- Mastering manufacturing technologies and processes and developing them further

New solution concepts and services
- Light engineering based on material and manufacturing technologies as well as component and working concepts
- Product-related services
- USP product design
- Digitalising design and factory planning processes
- Maintenance, repair and overhaul (MRO)

Efficient and sustainable processes
- Resource- and energy-efficient processes
- Material efficiency, recycling and recovery
- Efficiency through the use of modern component and process auditing methods
- Flexible partial automation
- Automated production related end-to-end chain of information
- Quality assurance and quality management Technologies and solutions based on metal

Technologies and Solution based on metal
- Technologies and solutions based on metal in currently existing industries
- Role of metal in new and emerging industries
- Sourcing, generation and transport of conventional energy carriers
- Role of metal in the production and storage of energy generated by alternative means
- Metal as an energy efficiency enabler
- Metal as a driver of sustainable transport
- Role of metal in mechatronics and electronics
- Role of metal in the recycling industry and in sustainable water management

Initiating innovations
- Initiating innovations



The key issues in the area of action **„Innovation Workshop“** fall almost equally into the three categories. This reveals that, although there is a solid basis of existing strengths that need to be strengthened, this area of action also covers seven key issues that call for urgent action. Besides these, five new options are addressed by five key issues that can unlock new market opportunities for the cluster.

„Strengthening strengths“

- Gaining and utilising materials technology knowledge
- Mastering manufacturing technologies and processes and developing them further
- Light engineering based on material and manufacturing technologies as well as component and working concepts
- Maintenance, repair and overhaul (MRO)
- Resource and energy efficient processes

- Flexible partial automation
- Quality assurance and quality management
- Technologies and solutions based on metal in currently existing industries
- Sourcing, generation and transport of conventional energy carriers
- Initiating innovations

„Keeping up“

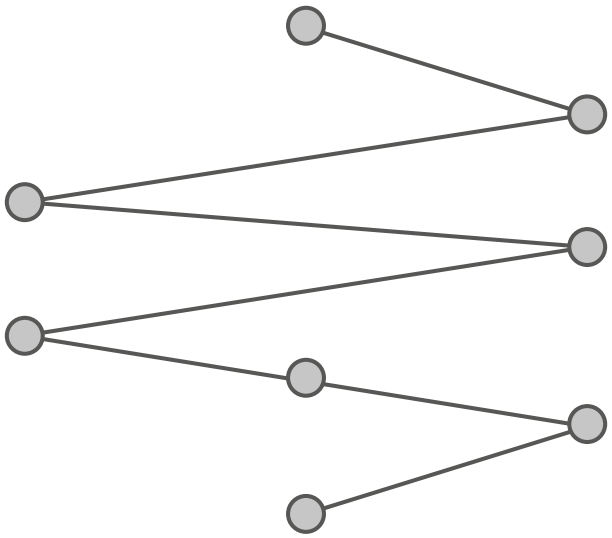
- Product related services
- Digitalisation of design and factory planning processes
- Materials efficiency, recycling and recovery
- Efficiency through the targeted use of modern component and process audits
- Automated production related end-to-end chain of information
- Role of metal in new and emerging industries
- Role of metal in mechatronics and electronics

„New options“

- USP product design
- Role of metal in the production and storage of energy generated by alternative means
- Metal as an energy efficiency enabler
- Metal as a driver of sustainable transport
- Role of metal in the recycling industry and in sustainable water management

Chart 15: Profile of the key issues in the area of action „Collaboration Network“

	Strengthening strengths	**Keeping up**	**New options**
	Expansion of existing expertise.	Vital development need. Further development of current basic expertise.	Considerable market opportunities in the long term. Further development of current basic expertise.
Collaboration Network			
Marketing and PR Marketing and PR			
Value creation and development networks in Brandenburg Establishment of competitive and flexible supplier chains			
Close collaboration Cluster and region independent networks Effective development and production collaborations			
Communication and knowledge transfer Knowledge and technology transfer Commitment to efficient grant and subsidy management The Brandenburg metal industry and corporate social responsibility			
Perception of Metal Cluster identity „The metal industry, a key player in Brandenburg‘s economy“			



The area of action „Collaboration Network“ also features an even mix of key issues that focus on strengthening existing strengths, as well as key issues where there is a need for development, and finally of key issues that offer new options.

„Strengthening strengths“

- Cluster and region independent networks
- Knowledge and technology transfer

„Keeping up“

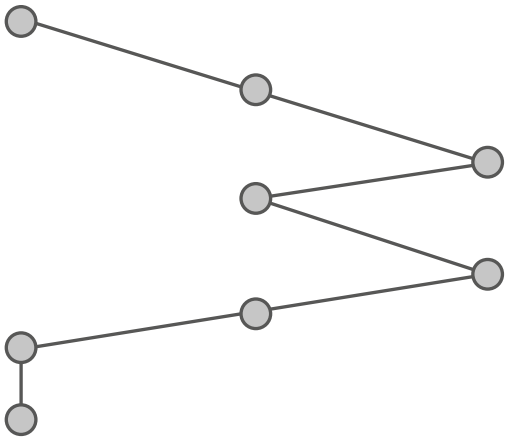
- Marketing and public relations
- Commitment to efficient grant and subsidy management
- Perception of identity: „The metal industry, a key player in Brandenburg‘s economy“

„New options“

- Establishing competitive and flexible supply chains
- Efficient development and production collaboration
- The Brandenburg metal industry and corporate social responsibility

Chart 16: Profile of the key issues in the area of action „Qualified Workforce Matrix“

	Strengthening strengths	**Keeping up**	**New options**
	Expansion of existing expertise.	Vital development need. Further development of current basic expertise.	Considerable market opportunities in the long term. Further development of current basic expertise.
Qualified Workforce Matrix			
Training and further qualification of workforce and managers			
Training and further qualification of workforce and managers			
Recruitment			
Retaining, gaining and re-recruiting qualified professionals			
Workforce retention			
Role of further education in increasing the number of qualified industry professionals and managers			
Succession planning (management and employees)			
Long-term engagement of workforce			
Green jobs			
Establishing the framework conditions for a working environment that is attractive in the long term - „good jobs“			
Workforce co-determination			
Asset workforce			
Asset workforce			



In the area of action „Qualified Workforce Matrix“, existing strengths must be strengthened, i.e. something that is already present must be developed further, with respect to three fundamental key issues that concern vocational training and education, and the everyday interaction in companies. Three further key issues call for additional efforts in order to „keep up“. Two key issues that concern the further qualification and long-term engagement of the workforce through „green jobs“ offer new options.

„Strengthening strengths“

- Training and further qualification of workforce and managers,
- Workforce co-determination
- „Asset workforce“

„Keeping up“

- Retaining, gaining and re-recruiting qualified professionals
- Succession planning (management and employees)
- Establishing the framework conditions for a working environment that is attractive in the long term - „good jobs“

„New options“

- Training and further qualification of workforce and managers
- Green jobs

The master plan addresses all cluster stakeholders. Over the next few years, the challenge lies in raising the profile of the existing activities and implementing additional activities initiated by the cluster stakeholders, as well as in establishing new stakeholder networks to unlock further synergies, and also in the successful sourcing of project funding, for example to facilitate flagship or pilot projects. Following on from the current status of the master plan for the only recently established Metal Cluster, there will be ongoing additions to the currently mentioned key issues where action must be taken, or these will be highlighted in more detail. To intensify the implementation activities (projects, measures and other activities) in the three areas of action, working structures will be activated in parallel, and an implementation plan will be developed.

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European Regional Development Fund

Financed by funds of the European Regional Development Fund (ERDF) and the Ministry for Economic Affairs and Energy of the State of Brandenburg.