

MANUFACTURING THE FUTURE WORKFORCE

VISIT REPORT: SWITZERLAND 



In partnership with

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INTRODUCTION

STRUCTURE OF REPORT

Each meeting report summarises general discussions, additional observations and further background information provided by the hosts about their organisation and its involvement with wider vocational and professional education and training systems and Centres of Innovation.

Individual meeting reports also ‘highlight’ good practice and useful counsel captured during discussions then subsequently explored in delegate group de-briefs. These highlights are brought together using headings common with other visits in the closing section of this report to support further analysis and leading to recommended actions.

This document and its references are an appendix to the overall *Manufacturing the Future Workforce* report.

The full report is available to download at: hvm.catapult.org.uk/mtfw

VISIT ITINERARY 28TH TO 29TH JANUARY 2019

1. **Swiss Smart Factory** Local innovation centre for I4.0, Bielle
2. **SFIVET** Swiss Federal Institute for Vocational Education and Training, Zollikofen
3. **SERI** State Secretariat for Education, Research and Innovation, Bern
4. **ETH** Competence Center for Materials and Processes (MaP), Zurich
5. **Inspire AG** Joint innovation centre, ETHZ and Swissmem, Zurich

Delegates

Chris Beck – TWI

Ian Collier – HVM Catapult

Graeme Henderson – Department for Education, UK (DfE)

Sue Loftus – National Physical Laboratory (NPL; attended 28th to 29th)

Jonathan Mitchell – Institute for Apprenticeships (IfA; now IFATE)

Daniel Sandford Smith – Gatsby Foundation

Paul Shakspeare – HVM Catapult

Flurina Kuhn – UK Science and Innovation Network, Switzerland

MEETING REPORTS

SWISS SMART FACTORY

Monday 28th January 2019. 10:00 to 12:00

1. Stock Garage Beyeler, Ipsachstrasse 26, 2563 Ipsach

<https://www.sipbb.ch/technology/?lang=en>

Hosts

Dr. Dominic Gorecky, Head of Swiss Smart Factory

Thomas Zurcher, Founder Mylivezone

Background

This visit followed discussions with DG at an event in the UK about Industry 4.0 support services and business models for engagement and learning. The Swiss Smart Factory facilities have been set up on a limited budget reflecting industry-oriented funding models and local partner base. The Smart Factory facility will move soon to join Medtech, Battery and Advanced Manufacturing departments in a new building in Biel centre.

In general, Swiss industry operates in a fragmented, cantonal economy with 99.6% SMEs however of these, 1/3 are global players. There is no national 'Industrial Strategy', hence initiatives such as Industrial Digitalization are locally driven and independent from government. A group of Trade Associations (e.g. Swissmem) founded 'Industry 2025' to focus on digital impact and action within a sector.

Smart Factory Discussion

Switzerland rates highly in international innovation comparisons with a stated assumption that this is related to the quality of the vocational and professional training and education system. There is some concern that the current cohort of teachers pre-dates much of the digital change now being seen by industry, hence teacher upskilling is a critical factor for continued success. Whilst the Swiss 'Dual-System' is respected and effective, future workforce solutions will need to proactively address the changing needs of tomorrow's companies.

Future digital technologies will also impact the way people learn and how they are trained as well as their future roles and occupations. 'Industry 4.0' will drive inter-disciplinary changes and require continuous adaptation leading to shorter training lifecycles with 'plug and play' solutions to 'T-shaped skills'. Digital technologies can support this with meta-learning (learn to learn), remote delivery, social methods and advanced systems such as VR.

DG commented that the work of the Smart Factory was trending to workforce development activities including demonstration and awareness raising, development of training offers and supporting other training providers.

MyLiveZone

TZ introduced their 'Distant Reality' methods to deliver experiential learning and assessment based on real equipment under the real time control of remote students. Examples were shown of PLC control technology where Siemens were able to certify competence at much reduced cost by increasing the in-use-time of training equipment and reducing travel and other student expenses.

It was argued that real-time video and distant interaction provided a more robust and ultimately cheaper environment to develop and assess competence than virtual reality methods. In addition, maintenance of training equipment was centralised and therefore more reliable than might be the case in a training centre environment. Modules are made available from shared sources which also centrally manage updates. This encourages trainers to incorporate these up to date modules and case studies which are close to industry practise into the relatively fixed structures of syandardised learning programmes.

Sentio Simulations

DG also works for this start-up business developing VR learning environments built from digital engineering resources such as DS Delmia and using the Unity gaming platform.

Swiss Smart Factory Highlights

- Industry leadership of initiatives is necessary in Switzerland where there are relatively low levels of government intervention with a fragmented and small-scale system which needs to ensure that local development of I4.0 solutions delivers value to industry. Within this context, there is growing focus on workforce development activities.
- Industry 4.0 will drive inter-disciplinary changes and require continuous adaptation causing shorter training lifecycles and require 'plug and play' solutions to T-shaped skills.
- Teacher digital upskilling in schools is vital to overcome the generational gap and to provide young people with a solid educational foundation.
- Availability of up-to-the minute case-study material encourages trainers to adopt latest technologies into their delivery programmes.
- 'Distant-reality' is now economic to use for competence building and compliance assessments as one of an increasing range of educational technology tools.

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- Opportunities for entrepreneurs to work in the context of an industrial collective to develop commercial solutions to industry and community needs.

Swiss Smart Factory – Information and References

MyLiveZone

<https://mylivezone.com/en/index>

Sentio Simulations

<http://www.sentio.net/>

SFIVET – SWISS FEDERAL INSTITUTE FOR VOCATIONAL EDUCATION AND TRAINING

Monday 28th January 2019. 13:30 to 14:30

Kirchlindachstrasse 79, 3052 Zollikofen

<https://www.sfivet.swiss>

Hosts

Erik Swars, Head of International Relations, SFIVET

Denise Felber, Digitalisation Manager

Background

SFIVET is responsible for research, development of occupations, basic and continuing training. The influence of SFIVET on the field of apprentice thinking is internationally significant and has been apparent during Study visits to Singapore and USA. This visit covered the core elements of the Swiss VPET (vocational and professional education and training) system, the role of SFIVET and digital transformation. The meeting was held in a teacher training institution. SFIVET is a part of the Federal Department for economic affairs, education and research (SERI).

The importance of vocational training as a pillar for innovation and competitiveness was stated. However, Switzerland has experienced similar recent low productivity growth to that of the UK in parallel with relatively low job mobility.

SFIVET Discussion

The presentation provided during the meeting was comprehensive, the following were the key points:

Swiss VPET System and SFIVET

The transparent, permeable and stable national approach to education and training provides the necessary solid foundation for the impact of slick marketing campaigns that are used to promote vocational entry points which may lead directly to professions or to higher education opportunities and will ease of translation to a different career path in future.

The system operates under collective governance comprising:

1. Confederation (SERI, SFIVET); carrying out Strategic management and development

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2. Professional Organisations / Private Sector (Trade, Social, Providers, Host Companies); developing content and apprenticeships
 3. Cantons; who implement and supervise through public and private means

There are some 80,000 new apprentices per year in 230 professions studying at 310 vocational schools. 30% of companies offer Apprenticeships. This figure includes about 8,500 adult learners (24+) on standard (45%) or shortened (24%) VPET programmes, direct examination (25%) or validation of prior learning (6%). Annually, 1,600 vocational teachers are in training, 5,800 completed CPD courses and 7,900 train as examiners.

SFIVET support Trade Associations with the development of qualifications and training plans, 'Branches' deliver practical training content on behalf of the Trade Associations.

All Swiss vocational students undertake a course related to an actual job, hence in theory demand matches supply, however some overall flexibility is necessary to allow for those choosing to progress to academic studies on completion of vocational learning.

Digital Transformation

The drivers of change were listed as: Digitalisation, Medialisation, Individualisation, Globalisation, Ageing, Democratisation, Flexibilisation and Economisation. These will cause changes to new products, production processes, distribution channels and will have consequences on professions, activities, competencies and qualifications. The McKinsey 'Future of Work' Report (Oct 2018) argues that 54% of big companies will need massive training and further education and that "Switzerland may need to rethink its education system."

SFIVET are using the Puente dura SAMR model to understand and define changes to vocations and professions leading to demands for 21st Century Skills – Critical Thinking, Communications, Collaboration, Creativity. (Metro 4C's rubric Performance Areas):

Standards Update

Over 200 VET programmes are reviewed annually working with professional associations to develop requirements and content. Evolution, not revolution.

It is clear that digital changes will require new competences which are reflected in a qualifications gap. There was concern that adult learners are unwilling to undertake further education and training to attain new competences.

Teacher Development

Teachers being trained for the dual system require industry experience prior to their 2-year, part-time courses carried out with a sponsoring school which provides a venue for practical application of learning. Training costs are met by the Canton; some teachers continue to work in industry as well as education. Motivation for teaching as a job includes professional pride, social contribution, job security.

Existing teaching staff remain resistant to the adoption of increased digital teaching techniques, tools and methods and sharing of teaching content.

SFIVET Highlights

- Promotion of vocational career routes is dependent on society's 'faith' in the outcome being as advertised. This requires stability and consistency in the underlying policy and funding.
- Vocational learning places and job opportunities are balanced.
- Central role of Trade Associations to aggregate and evidence demand for new 'professions'/'tasks' and subject to approval, develop standards, qualifications and training plans.
- Risk of digitalisation overload – but future thinking will be computer-aided, networked / interdisciplinary, analytical.
- Equivalence of German 'Social Compact' to maintain consensus and common purpose.
- 10% of apprentices are adult learners taking advantage of alternative pathways to the same qualification outcomes.
- Relatively large numbers of vocational teachers are under initial and continuing training. All vocational teachers must have relevant industrial experience, many maintain a dual industry/education role.

SFIVET – Information and References

Vocational and Professional Education and Training in Switzerland (Facts and Figures 2018)

<https://www.sbf.admin.ch/sbf/en/home/services/publications/data-base-publications/vocational-and-professional-education-and-training-in-switzerland>

The Future of Work: Switzerland's Digital Future

<https://www.mckinsey.com/featured-insights/europe/the-future-of-work-switzerlands-digital-opportunity>

SERI – STATE SECRETARIAT FOR EDUCATION, RESEARCH AND INNOVATION

Monday 28th January 2019. 15:00 to 16:00

Einsteinstrasse 2, 3003 Bern

<https://www.sbf.admin.ch/sbf/en/home.html>

Hosts

Anouk De Bast, Head of International Relations, SERI

Background

SERI is a federal organisation, working with the 26 Cantons, to overlook the national innovation system. This visit was to investigate national policy linking technology and workforce development, in particular the role of SERI to promote Vocational Education 2030 and the Swiss Digitalization Strategy.

The Swiss innovation system is described as being science-based, able to innovate sectorially and is market oriented.

SERI Discussion

Innovation

Although described as an innovation ‘system’, the Swiss approach is seen as a self-regulating and stable ‘eco-system’ that reflects, not drives the Swiss innovation model. The principles are:

- Federalism balancing competitiveness and subsidiarity at a cantonal level (solutions start at a local level)
- Quality awareness as a pre-requisite
- Working with independent institutions, each with autonomy and working cooperatively

2/3 of the Swiss 3% R&D spend is from non-state sources. Innosuisse (equivalent to Innovate UK) funds R&D centres (which may have trade body involvement, e.g. Inspire) and does not provide public money to private companies.

Education and Training Standards

SERI (including SFIVET) own and develop the dual-system standards, however the Trade Associations have control over content. It is typically a 2-year process to develop a new standard from scratch and takes 6 months to review and adapt existing ones. Each standard is reviewed every 3 years.

In simple terms, 'Branch' training centres train and examine to Federal exams and are supervised by SERI, whilst STEM and general education is provided by Cantonal schools. Labour market issues and specific skill content are the concern of the Trade Associations and closely related to Branch training. Hence, responsibility for Dual System training standards lies in the same government department as that for research and innovation.

Digitalisation

Swiss 'Strategy 2030' provides social and political context for future skills mega trends. Greater flexibility and permeability will be necessary with anticipation of skills needs replacing reaction to demand. Individuals will need to become more self-motivated to address learning needs and to invest the effort and cost required.

The current situation is typified by much of the learning for new technologies taking place on the job to meet industry's needs and where Government doesn't attempt to define skills in the 'eco-system' model since 'if people have good basic knowledge, they should be able to learn new technologies'.

It was emphasised that not all firms work on the leading edge and that skills development is limited to the absorption capacity of the business.

SERI Highlights

- Switzerland has a highly organic innovation 'eco-system' reflecting cantonal and industry leadership where SERI and other government bodies are Overseer, not Director.
- Importance of Trade Associations to develop and maintain training specifications and provide specialist delivery at 'Branch' Training Centres.
- Future digital trends will require anticipation of skills needs in place of reaction to demand but not all businesses are at the leading edge of technology or have the immediate absorption capacity for new skills.
- Much of the learning for new technologies takes place on the job to meet industry's changing demands for skills founded on people who already have good basic knowledge, and able to learn new technologies, tools and methods.

SERI – Information and References

Research and Innovation in Switzerland

<https://www.usi.ch/sites/default/files/storage/attachments/press-research-innovation-switzerland-sefri.pdf>

ETH – COMPETENCE CENTRE FOR MATERIALS AND PROCESSES (MAP)

Tuesday 29th January 2019. 09:00 to 10:30

Technopark, Technoparkstrasse 1, 8005 Zürich

<http://www.sce.ethz.ch/en/>

<http://www.map.ethz.ch>

Hosts

Anders Hagström, Head of ETH Global

Larissa Schefer, MaP Executive Director

Background

ETH Zurich is one of two Federal Technical Universities in Switzerland, MaP is one of 5 ETHZ interdisciplinary competence centres and works on the development and understanding of new materials and processes. (Others are Medicine, Data, Sustainability and Manufacturing Technology.)

Research activities cover materials characterisation, technology transfer and applications reacting to market needs within 5 years. Research is proposed by ETHZ with input from an Industrial Steering Committee. Initial 'ideation' is carried out by faculties separated from industrial influence and supported by internal funding, some spin-outs. The ETH Foundation channels industry and philanthropic donations.

There are ongoing reviews of undergraduate teaching with the intent of including greater levels of problem-based learning ('fail forward'), however not all projects can arise from industry since it is important to maintain links with research and wider educational needs.

ETHZ MaP Discussion

'Further Education'

The vast majority of ETHZ students are young people from secondary education with either an academic or vocational baccalaureate. The School for Continuing Education (part of the Rector's central office function) targets mature students across the university, small numbers of students enter from the Universities of Applied Technology - often very good candidates.

Distinguished Lecture Series are run for Industry and Academia with a wide selection of speakers. They are open to industry and individuals as well as ETHZ full time students.

'Manufacturing the Future' week-long courses include critical thinking to add human dimension to science and technology study for students. Incorporating industry case studies.

'ETH Sabaticals'

These are a recent initiative emerging from Partnership Council discussions to provide customised continuing education for technical industry professionals. They are designed around a Certificate of Advanced Study (CAS) during some 360 learning hours which equates to 2 months full time study with a fee of CHF 16,600, the certificate will count towards later Master's study through the School for Continuing Education.

Candidates will have graduated at a tertiary level and have gained industry experience. The new programme has been challenging since it adds to demands on faculty staff and will require IP management during the industry based project elements in the research groups. The first candidate is now starting, with a target of 5 recruits this year, potentially rising to 20 per year.

Technology Transfer

Inspire (see next visit) is an example of how ETH works with Trade Associations to deliver technology transfer.

ETH-Z Highlights

- Slow trend towards academia from vocational routes. Student opportunities to progress from Applied Universities to ETHZ to develop academic and research interests.
- Knowledge transfer events for undergraduate students and others are used to broaden subject matter beyond technical foundations.
- CAS, short programme approach using 'Sabaticals' for industry personnel combining taught and problem-solving elements (mini-EngD at Masters' level). Challenging for academically focussed departments, hence slow ramp-up.
- Some adoption of undergraduate problem-based learning programmes.

INSPIRE AG, ETHZ AND SWISSMEM

Tuesday 29th January 2019. 11:00 to 12:30

Technopark, Technoparkstrasse 1, 8005 Zürich

<https://www.swissmem.ch/en.html>

Hosts

Martin Stöckle, COO Inspire AG

Alisa Ripenyan, Research Leader I4.0, Data Enabled Manufacture

Josef Stirnimann, Research Leader Micromachining and Laser machining

Robert Rudolph, Leader Digitalisation and Innovation, SwissMem

Background

Inspire is ETH Zurich's and Swissmem's joint technology transfer competence centre for manufacturing. It was established in 2004 by ETHZ, Swissmem and SERI and is now owned 66% by industry and 34% by ETHZ. It has some 80 staff with 40 PhD and 20 Masters students working with an annual revenue of CHF 12m to conduct applied research and knowledge and technology transfer projects (funded on the 'thirds' model).

Inspire has 10 specialist technical groups supervised by ETHZ professors. Academic publication is a requirement. They also offer Lean/6Sigma courses.

Swissmem has 1,100 member companies from electrical and mechanical engineering industries – which is an important sector of the Swiss economy. They operate an academy providing a wide range of technical and managerial short courses and qualifications on a commercial fee basis.

Inspire Discussion

Trade Association and Innovation

Innovation was described as 'a novel idea that results in a successful product on the market'. Inspire operates at mid TRL and focuses on SME research reflecting a growing gap between academic research and industry take-up.

Loosely based on the Cambridge Enterprise model of: IP + Licensing + Consultancy = Commercialisation. (No mention of workforce development.)

14.0

One area of Inspire work is looking at the interface of machine learning, data analysis, algorithms, control systems and optimisation where the pace of change leads to industry capability now lagging market opportunities. Students working in this area are both Masters and Doctorates. 80% are international, not Swiss.

Micromachining

Laser Ablation Processes - ultrashort laser pulses - for fine microscale cutting. Developing tools for cutting fine threads M2.2 in zirconium oxide. Using Carbon Tungsten tools at small scale to produce smooth surfaces.

Skills will be embedded in the process technologies instead of the machine operators.

Swissmem – Trade Association

Robert Rudolph had recently moved on from responsibility for education programmes to concentrate on innovation. He made several strongly argued points of relevance to the Study.

- The reality of Mittelstands and SMEs is that they need the latest proven and developed technologies and not necessarily to undertake major innovation programmes. Their priorities are today's problems. (Swissmem's innovation support consultants are therefore under-occupied.)
- Such companies rely on the VET system to instil understanding of the fundamentals of technology in their students with companies providing work-based learning of relevant technology and business practices.
- Swissmem 'own' 8 technical professional standards and work on a 5 year review cycle with periodic major reform. Changes to technology could be seen to require an increase in the number of standards, the challenge is how to do this in a modular way to add new competences to changing professions with greater flexibility and enhance the capability of those already in jobs. This costs Swissmem some CHF 3m annually for standards development, course definition and preparation of learning resources.
- It is important that standards continue to reflect the available workforce talent and job opportunities to maintain stability of the VET system. Innovation takes place within companies and therefore relies on the talented and trained personnel of those companies and builds on the prior investment in their education.
- The major concern of Swissmem's members is 'having enough staff' with twice as many retiring as entering the workforce and a growth of preference for academic routes.

Inspire AG and Swissmem Highlights

- Inspire is a knowledge transfer innovation organisation but does not offer ‘training’ which lies with ETHZ, its academic partner.
- Public/private ownership of companies such as Inspire better embed cooperative behaviours than loose collaborations.
- Swissmem advocate more problem solving training related to current technologies than creation of future technology programmes that may not match industry short to mid-term needs. Innovation is a **‘novel idea that results in a successful product on the market’**.
- Swissmem ‘owns’ its apprentice standards and provides teaching content to support at considerable cost (to their members).
- Dual System Standards must align with both available workforce talent and job opportunities.
- Twin workforce development needs of skills for today and the ability to continue learning requiring a modular approach that provides flexibility to meet changing demands due to increasing pace of change and without creating new professions.
- Future technologies will embed more skills in machines and processes and therefore emphasise the need for greater analytical ability.
- Very high level of international students.

Swissmem – Information and References

Swissmem Academy

<https://www.swissmem-academy.ch>

GOOD PRACTICE – CORRELATED HIGHLIGHTS AND COMMENTARY

RELATED TO VISIT REFERENCE (N)

POLICY AND STRATEGY

Parity of Swiss Dual System (2, 3, 4)

- Successful promotion and delivery of vocational career routes are dependent on society's 'trust' in the transparent and permeable outcome being as advertised. This requires stability and consistency in the underlying policy and funding resulting from the equivalent of the German 'Social Compact' that maintains the consensus and common purpose of State, Canton and Private (industry) partners.
- The significant general education content within vocational routes enables future progression, hence it is not unusual to progress from a vocational entry point to academia.
- Dual System Standards must align with both available workforce talent and job opportunities.
- Each of the visit hosts provided a clear and totally consistent message about the overall Swiss Dual System despite the widely varying organisations (in contrast with expectations of a similar group in the UK).
- There is a slow trend for young people to choose academic routes in place of vocational, however the proportion is effectively rationed by examination at the end of the secondary education stage to result in 2/3 of students being routed to vocational studies (all with associated employment). Significant numbers then progress through 'Applied' universities to 'Research' universities, such as ETHZ, to develop future academic and research interests.

Impact of Digitalisation (1, 2, 3, 5)

- Digitalisation overload needs managing.
- Industry leadership is more necessary in Switzerland where there are low levels of government intervention and fragmented and small-scale support systems which need to ensure that local development of I4.0 solutions delivers value to participating small companies. Within this context, there is growing focus on workforce development activities as the pace of change quickens.
- Industry 4.0 will drive inter-disciplinary changes and require continuous adaptation, causing shorter training lifecycles and needing 'plug and play' modular solutions to meet 'T-shaped' skills profiles. It also reduces clarity of professional differences as

captured in training standards and leads to preference for a modular multi-disciplinary approach founded on solid fundamental understanding of manufacturing.

- Future digital trends will require anticipation of skills needs in place of delayed reaction to future demand at the time of need. However, not all businesses are at the leading edge of technology or have the immediate absorption capacity for new skills.
- Future technologies will embed more skills in machines and processes and therefore emphasise the need for greater analytical ability where future thinking will be computer-aided, networked / interdisciplinary and analytical.
- Switzerland has experienced similar recent low productivity growth to that of the UK with relatively low job mobility, hence the importance of digital solutions and the potential need for Switzerland to re-think its education system (McKinsey).

EDUCATION AND TRAINING PROVISION

Standards (2, 3, 5)

- Trade Associations have a central role to aggregate and evidence demand for new 'professions'/'tasks' and subject to government approval, develop standards, qualifications and training plans working with SFIVET. Swissmem 'owns' its apprentice standards and provides teaching content and support at considerable cost to the organisation and its members.
- Branch training centres, connected to the Trade Associations, provide specialist work-based training elements. (cf. German Inter Company Vocational Training Centres – ICVTC).
- New and revised standards are supported by 'Training of Trainers' as they are implemented.
- Twin workforce development needs of skills for today and the ability to continue learning require a modular training approach which provides flexibility to meet changing demands due to increasing pace of change and without creating new professions.

Teachers and Trainers (1, 2)

- There are relatively large numbers of vocational teachers under initial and continuing training. All vocational teachers must have relevant industrial experience, many maintain a dual industry / education role.
- Availability of up-to-the minute case-study material encourages trainers to adopt latest technologies into their delivery programmes and is popular with teachers.
- Teacher digital upskilling in schools will be vital to overcome a generational gap.

Educational Technology (1, 2)

- Need to grow blended learning offers. Digital technologies can support this with meta-learning (learn to learn), remote delivery, social methods and advanced systems such as VR.
- 'Distant-reality' is now economic to use for competence building and compliance assessments as one of an increasing range of educational technology tools.
- On-line modules increase overall teaching quality as a result of shared investment in both the original content and its subsequent upkeep.
- Use of gaming engines enables the integration of design and engineering data into VR training scenarios.

Lifelong Learning (2, 5)

- 10% of apprentices are adult learners taking advantage of alternative pathways to the same qualification. However, this is balanced by concern that adult learners are unwilling to invest time and effort in continued learning.
- In work upskilling is the responsibility of companies as they undertake innovation and hence is reactive and reliant on the strength of understanding provided by previous education.
- Swissmem Members' major concern is their continued access to sufficient staff given that twice as many are retiring as entering the workforce.

CENTRES AND SOURCES OF INNOVATION

Knowledge Transfer (1, 4)

- Short programmes (2 to 6 months) using 'Sabbaticals' for industry personnel combining taught and problem-solving elements (i.e. mini-EngD at Masters level). This has proved challenging for academically focussed departments and hence had a slow ramp-up.
- Opportunities for entrepreneurs to work in the context of an industrial collective to develop commercial solutions to industry and community needs, reflects the low levels of state intervention in industry driven strategic approach.

Connectivity (3, 5)

- The highly organic Swiss innovation 'eco-system' reflects cantonal and industry leadership where SERI oversees, not directs activities.

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- Public
 - /private ownership of companies such as Inspire better embeds cooperative behaviours than loose collaborations working on a project by project basis.
 - Swissmem advocate more problem solving related to current technologies than creation of future technology programmes that may not be related to industry short to mid-term needs. Innovation is a 'novel idea that results in a successful product on the market'.



ABOUT THE HIGH VALUE MANUFACTURING CATAPULT

The High Value Manufacturing Catapult creates the conditions for economic growth by enabling UK manufacturers to achieve significant improvements in their performance and productivity. We do this by providing open access to world-class innovation capability and technical expertise, enabling companies to embrace different ways of working, adopt new technologies and achieve step-change in their performance.

To find out more about the High Value Manufacturing Catapult, please visit:
hvm.catapult.org.uk

High Value Manufacturing Catapult
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Blythe Valley Business Park
Solihull
B90 8AG

ABOUT THE GATSBY FOUNDATION

Gatsby is a foundation set up by David Sainsbury to realise his charitable objectives. We focus our support on a limited number of areas: plant science research; neuroscience research; science and engineering education; economic development in Africa; public policy research and advice; the Arts.

To read more about its work in Education, please visit: www.gatsby.org.uk/education

The Gatsby Charitable Foundation
The Peak
5 Wilton Road
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Registered Charity No. 251988

The full report is available to download at:
hvm.catapult.org.uk/mtfw

If you have any questions about this report, please contact the authors via email:
info@hvm.catapult.org.uk

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