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Opinion Education

# Small companies, vocational training help Swiss weather digital disruption



In the face of the growing technological revolution – digitalisation and artificial intelligence – Switzerland has a number of assets. Some are well known and visible: the quality of its higher education institutions, its research and its entire innovation ecosystem. But two of these assets, although very important, are neither very visible nor well understood.

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Dominique Foray, Swiss Science Council

These two assets enable Switzerland to effectively resolve a crucial problem, one that all developed countries are today confronted with. This problem concerns not innovation, but the diffusion of innovation, its absorption and propagation throughout the whole economic system.

This is an essential problem.

Indeed, it is one thing to promote a system allowing certain companies and entrepreneurs to innovate, but quite another to get these innovations adopted and diffused throughout all the industries and services making up a country's economy. And yet this second point is just as important as the first for increasing productivity and creating the *right* jobs of the future.

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## Why melting glaciers affect us all

Alpine glaciers could disappear by the end of the century. The consequences will be felt not only in Switzerland's mountains but throughout Europe.

But diffusing breakthrough innovations – like those characteristic of digitalisation – poses considerable problems and challenges. As explained by US economist James Bessen in his book [Learning by Doing](#), the main problem is how to, at individual and company levels, acquire the new technical knowledge to develop and use these new technologies effectively.

“Developing the knowledge and skills needed to implement digital technologies on a large scale is a difficult social problem, particularly in the early stages of the new technology,” Bessen writes. “Early technical knowledge is typically too fragmentary, uncertain, and constantly changing to be standardized. Prior to standardization, classroom education is difficult and labour markets may not reliably reward workers who invest in their training.”

There is thus a need for robust and efficient institutions to enable workers to acquire this new technical knowledge and for companies to gain access to the corresponding innovations. Switzerland does have these two assets: its unparalleled professional training system and its fairly effective organisation of access to new technological knowledge through small and medium-sized enterprises (SMEs).

## **Vocational training: unique and special**

The Swiss professional training system is unique in the world thanks to its institutions and modus operandi but also its reputed high social value. The institutions include the famous dual apprenticeship system, whose effectiveness is closely related to the extremely high quality of the coaching and supervision offered by companies.

Also included are the Universities of Applied Sciences that offer opportunities for more extensive training to those who, having chosen the vocational route, wish to prolong their education beyond the basic qualifications.

Professional training is highly valued socially – in comparison to academic training – by both labour markets and families. This means that it's often the best students from a particular age group that will decide to follow this route.

**Dominique Foray**

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The impact of professional training on innovation and productivity in Switzerland is absolutely obvious and proven. The reason for this impact is that the professionals situated at the lower hierarchical levels of the company who have followed the professional training route have not acquired less knowledge than those at higher levels, who have academic training; they have simply acquired different knowledge that is essential for the innovation capacity and productivity of the company.

This is what makes Switzerland different from many other countries that rely exclusively on academic training and consider professional training as the poor relation of the system. This is a serious mistake! As Professor Guzzella, former president of the Federal Institute of Technology ETH Zurich reminded us: “In the US you have the same brilliant innovators in research and development that we Swiss do, but here the lab technician can make prototypes to specification that are higher in quality than anywhere in the world.”

## **Bridges between SMEs and academia**

Access to new technological knowledge by SMEs is a complex problem since small companies and the academic world find it hard to communicate and implement partnerships. Intermediary institutions are usually necessary to carry out the knowledge and technology transfers to enable small companies to undergo transformation.

Historically, Switzerland has distinguished itself by the creation of such institutions – not as the result of state policy but through spontaneous processes by which companies identify technological needs (training, research, specialised services) and form a club or create a private institution to meet these needs.

This spontaneous creation of private institutions that resolve problems of collective action (such as cooperation between SMEs and a Swiss higher education institution) involves a large number of industrial associations, research centres and clubs that significantly enhance innovation ecosystems by providing these companies with the additional capacities they need to innovate, without any decisive state intervention.



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These two institutional forms constitute important pillars of a prosperity based on innovation and its diffusion. Switzerland must preserve them at all costs.

And if we understand them correctly, we see that these forms fundamentally rely on the capacity of managers to recognise the importance of each company's contribution to collective action (by providing apprenticeships or cooperating in the technology transfer domain) as a decisive factor in their private prosperity.

What should be upheld, whatever happens, is thus without any doubt a certain Swiss management tradition.

*The original version of this article appeared on the [Swiss Science Council's \(SSC\) blog](#). The SSC is a consultative body to the Swiss Federal Council, which deals with higher education, research and innovation policy matters that affect Switzerland as a location for science.*

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