Siemens – keeping the spark of innovation alive in a giant electrical company

SIEMENS

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Managing Innovation

Background

Werner von Siemens founded his company in 1847 based on his design for an improvement to the electric telegraph machine. He teamed up with a precision toolmaker, Johan Halske and they established the "Telegraphen-Bauanstalt von Siemens & Halske" with 10 employees in a small courtyard factory in Berlin. They were lucky in 1848 to win a contract to build a new telegraph line , then the longest in Europe, from Berlin to Frankfurt which was successfully opened in 1849. They never looked back.

Today Siemens is a global business, still drawing on its heritage of electrical engineering but active in many fields including medicine, energy, transportation, smart cities and , increasingly, services. It employs 293,000 people in over 40 countries and had a turnover of around €57bn in 2020.

Its vision for the future includes continuing the transformation form a product-led business to one with an increasing service model – for example in integrating and supporting the many devices across the 'internet of things' which it also provides in its wide range of industrial automation products.

Innovation claim to fame

This firm is yet another of the '100 club', LINK – companies which have survived and grown through innovation over the past hundred years or more. Its early years were characterized by many major product breakthroughs and they established a strong brand name around the world with a reputation for quality and innovation.

Increasing pressure on their traditional markets and high competition in the new technology fields which it entered (such as telecommunications) forced a realization that the old and somewhat bureaucratic structures and procedures needed to be revamped around a capability for 'reinvention'. They appear to have been successful in doing so, maintaining their core businesses but growing strongly in new fields like computers and medical instruments through opening up to multiple sources of new, 'do different' innovations.

But their successful track record in innovation is not an accident; there is consistent strategic commitment to it. Since their earliest days they have recognised the importance of doing their own

research and building competence; increasingly this has also been fuelled by extensive external links to other firms, scientific institutes, universities and other centres. They currently have 40,700 people working in R&D representing around 14% of the total workforce and they invested €4.6bn in R&D in 2020, representing close to 10% of turnover. They hold close to 43,000 patents and continue to add to their stock of knowledge; in 2020 they filed about 2,740 patents and submitted round 5,120 invention disclosure reports. That's equivalent to 23 inventions per day!

How do they organize and manage innovation?

From their earliest days they built a strong foundation in product development based on deep technological roots and a high R&D spend. Recent years have seen a shift towards leveraging the wide knowledge base which the company has built up – as one interviewee put it, *'If only Siemens knew what Siemens knows …'*!

There has also been a recognition that growth through innovation will depend on carrying out a deliberate search for non-current products and enabling technologies (looking in unexpected places) and in keeping the units which take those ideas forward as small and focused as possible rather than trying to run them through the large and somewhat staid organization of the present.

(An early example of the success of their approach to increasing the volume of ideas was in their Medical Division where, in the first year of the 'Impulse'innovation programme, 450 project ideas emerged, 70% of which came from outside the division. These led to 11 business plans for new ventures and 3 major product fields resulted. By the late 1990s, after this process had been running for five years, the company had around 1 invention per day and two thirds of their $5bn sales were being generated by products that had been introduced during the previous two years, 50% of the ideas for which came from outside).

Innovation strategy and leadership

A number of key strategic enablers are worth flagging:

- Strong cultural value around innovation, grounded in the company's long history, now being matched by a new, complementary value around entrepreneurship.
- Willingness to reinvent and to let go – a strong feature of recent history – changing the vision.
- Specific and targeted change initiatives to increase the volume of ideas feeding into the innovation process.

- Management 'coaches' as expression of commitment to see the process through (counters the 'flavour of the month' problem).
- Resource allocation to allow for 'slack' and curiosity-driven working –effectively gives 'permission' to try new things out.
- Internal venture funds to allow progression of new ideas along parallel fast tracks to mainstream innovations.

Enabling the process

The company has an effective and well-established process for 'do better' innovations but it is interesting to explore the systems which they have put in place alongside these to enable them to find and exploit radical, 'do different' innovations. Mechanisms here include:

- Active search for new and different knowledge to complement the in-house base, deliberately looking for those which do not fit the current product/technology portfolio (a kind of parallel search approach).
- Training and use of 'change agents' with the task of turning new knowledge garnered through these networks into live projects (a kind of innovation product manager role).
- Use of 'technology accelerator' and 'technology to business centres' as a way of structuring a fast track for such ideas into action.
- 'Spin-in' and 'spin-out' system for converting innovative ideas into development projects via non-traditional routes, more closely modelled on individual entrepreneurship.
- Emphasis on a 'maverick'/ rapid execution process to move things through quickly and enable fast failure and rapid learning.
- Use of alternative channels and networks for market research, running in parallel with 'do better' mainstream structure.
- Use of new innovation tools like 'innovation fields' to explore future scenarios, road mapping to define technology pathways, etc.
- Use of external partners in what they call a 'hot making' process to increase the volume of externally-triggered innovation ideas.
- Use of idea push approaches to increase the volume of internally- driven ideas into the system. An example here is the 'Impulse' programme and its follow-ups – a regular process which attracts ideas and funnels them via a selection board made up of cross-division representation. Around 25% of ideas are taken forward so there is a continuing flow.
- Both 'Impulse'-type and mainstream approaches generate large volumes of ideas but the problem is incubation and development. To help deal with this Siemens has a complementary venture arm and incubator units – an in-house start-up system for new business where seed capital, personal skills development, etc. can be moved along. In turn these are passed to 'Innovation Task Forces', dedicated groups recruited from across divisions (around five people usually) and given a venture capital budget to work up a business plan for a new product field. At the 'go'/'no go' decision point, the project is launched or transferred to another division to launch or spun out to the outside (but here an equity stake is retained to ensure a return of funds for the venture capital pot).

There is also concern about knowledge management – *'We are careful what we let out of the door!'.*

- An alternative to spin-out is linkage to satellite firms, local hi-tech SMEs which can act as innovation incubators. These have the advantage of retaining an entrepreneurial SME culture but with access to the resources and knowledge base of a giant organization like Siemens.
- A dedicated team of 'scanners' whose role is to search and transfer knowledge across Siemens and from universities, research institutes, other firms, etc.

During the past decade Siemens has, like other large firms such as Procter and Gamble, worked hard to open up its approach to innovation, drawing in not only external players but also reaching across its global workforce to leverage their ideas. In its current form the Siemens innovation ecosystem is a powerful resource for finding and deploying ideas and for moving them through to value creation.

Building the innovative organization

Over its 170 years the company has learned a great deal about the type of organization which can foster entrepreneurial thinking and channel it into new products, services and processes. Key lessons include:

- 'Hierarchies kill innovation': this has led them to a deliberate attempt to get away from vertical structures which typified the past and towards flat/knowledge-mixing structures.
- They use 'knowledge culture' as the new organizing model rather than efficient use of resources as the key structuring principle.
- Structure has shifted from a region focus to one which has a strong customer sector focus.
- Empowerment and autonomy through giving people 'slack' time to explore new ideas.
- Idea generation/suggestion processes like 'Impulse': incentives for innovation that are based on participating not on the value of final ideas. However, for those ideas that are taken forward, there is the incentive of playing a major role in the subsequent development, which engages commitment and 'championship' of ideas.
- 'Encourage the natural entrepreneur'.
- As suggested above their efforts to reach out to and connect across their global workforce have opened up a powerful internal innovation engine

Linkages and networks

- Creation of internal (cross-division/functional/discipline) networks which bring different knowledge sets together.
- Parallel setting up of new external networks. Staff (not marketing) are empowered to initiate a process of intense customer contact – 'hot making' – to identify/generate new possibilities.

- Sales are also heavily involved in tracking lead users but also in actively searching out new customers in this 'hot making' process. The idea is to generate leads for R&D via a process of learning from and with customers. Sales teams are also rotated to bring different perspectives to bear.
- Staff work as 'hit teams' to target conferences, scan academic and other journals, look at competitor firms, etc. – essentially active scanning and then coming back to report in a formal way, building a stronger technological intelligence system.
- Targeted search for new and complementary knowledge sources via alliances, joint ventures, etc.
- Particular emphasis within these JVs on working with hi-tech SMEs who are then allowed to retain their identity and character – i.e. not instantly absorbed into the mainstream culture and procedures but 'incubated' and allowed to continue to grow along their own entrepreneurial trajectories.
- Development of their own version of open innovation building on a number of powerful approaches and tools to help create an externally-focused innovation ecosystem

Learning and capability development

The company recognized that it needed to change a large firm culture but decided not to do so in one hit. Instead they have made extensive use of a 'learning laboratory' approach where good practices evolved in one division are then transferred out into others so that the new approach spreads organically. An early success was in the computer division where margins had been 30% below the industry average but where they are now very competitive and innovative. There is now extensive and deliberate cross-divisional learning about innovation management.

Central to their continuing success is a process of reflecting on the past, looking critically at what has worked – in terms of innovation routines – but also what hasn't, or what worked for them in the past but now needs to be updated. And they have explored the need for new routines, adding systematically to their capability for managing innovation.

Further links

There is a wealth of information on the company's website, including a detailed innovation history. See, for example:

https://new.siemens.com/global/en/company/about/history.html

https://new.siemens.com/global/en/company/about/businesses.html

https://new.siemens.com/global/en/company/about/history/technology.html

The continuing development of their open innovation ecosystem is well-described in this interview with Christoph Krois, Open Innovation Manager for the company

https://www.youtube.com/watch?v=H2cDoyos9Zc

And in this website describing the many elements in the ecosystem
https://new.siemens.com/global/en/company/innovation/collaborations-partnerships.html

and via links such as this inviting participation in the ecosystem and various 'challenges'

https://ecosystem.siemens.com/