



The Curse and Blessing of the Ongoing Innovation Boost in Battery Technology



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Opinion

From the perspective of an engineer, you might think that innovation can only be seen in a positive light. At first glance, this is absolutely the case - the further development of technologies of all kinds is presumably pleasing for anyone interested in technology. In the case of battery technology, which has now found its way into everyday life through mass-produced electric mobility, customer expectations are quite understandable and another reason for the positive trend. The end user of electric cars has been offered more and more vehicles in recent years, from:

- i. more range,
- ii. lower investment costs
- iii. fast charging options through to
- iv. more environmentally friendly materials.

On the other hand, companies are faced with the challenge of backing the wrong horse when it comes to defining technologies. Long-term investments must be made at an early stage in order to develop the innovation into a product that is suitable for industry. There are long integration loops to implement new technologies, the development team has to become familiar with the new technologies and then usually has to perform extensive testing and validation procedures. This means that on industrial scale, practical implementation is significantly more restricted due to the amount of testing and verification that is required. It is becoming increasingly difficult to implement positive technical developments in industrial series products.

There is a range of solutions for this:

- i. Good technology scouting including technology management to identify suitable trends.
- ii. Fast implementation in the industrialization of innovations through optimized transfer of work packages at supplier interfaces.

- i. Through cooperation between key suppliers in the medium-sized companies (SMEs) or
- ii. Complete in-house processing at large OEMs in the automotive sector.

While the world's largest car manufacturers implement everything "from a single source" - from the extraction of raw materials in mines, the development and production of the relevant components and the assembly of larger components through to the vehicle - this is not typically the case for medium-sized companies. Successful SMEs tend to define themselves through specialization and expertise in sub-applications or niche markets.

At least the following core components are required for the production of mobile high-voltage batteries for traction applications:

- i. Cells as source of energy.
- ii. Cell contacting system for the high-voltage circuit.
- iii. Battery management system for data processing and control.
- iv. Measurement sensors and cut-off devices.
- v. Temperature control options and, so far.
- vi. A Housing.

However, the key component is the battery cell - as this has a significant influence on the system properties of the battery. Whether it is the amount of energy stored, the ability to charge quickly or the durability is defined by the selected cell. All other components play a supporting role. As the battery cell is the biggest lever, this component provides the biggest boost to innovation. This is another area where we need to take a closer look, because there is no such thing as "the cell".

It is important to differ between the following:

- i. Cell formats (prismatic, cylindrical, pouch).
- ii. Cell chemistries (liquid electrolyte: such as SIB, LFP, NMC and LTO or semi-liquid).
- iii. Cell properties (temperature, charging/discharging, lifetime, safety, recyclability).

Since innovations in one or more fields of cell technology are currently being launched on the market within a few months, it is all the more challenging to be able to adequately evaluate the

technical innovation and implement it in series production. Some countries have defined a technological roadmap at national level. This provides security for the industry and is successful as long as this roadmap and the actual innovations are aligned.

Other national solutions include the promotion of technical competence centers. In this way, central questions can be researched and answered. At the industry level, flexible technology consulting services, including the ability to quickly set up prototypes, will be a key point of contact for SMEs - without the need for them to set up prototypes themselves.



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