Buying at the very edge of our understanding

Things can get complicated for the procurement team at CERN, when what the scientists need is often beyond the capabilities of industry.

Save for a few remote tribes, there are few places left on the planet where people haven’t heard of the World Wide Web. More recently, the ‘Large Hadron Collider’, which found the Higgs boson elementary particle, has also entered the modern lexicon. One revolutionised global communications; the other is at the very edge of our understanding of the universe. What connects them is that both hail from the European Organization for Nuclear Research – or CERN – an intergovernmental organisation based in Geneva where physicists and engineers probe the fundamental laws of nature. Momentous discoveries made at CERN, together with appealing clog-dancing personalities such as Professor Brian Cox, and a host of new TV and radio series for enquiring minds, have propelled science into the mainstream once again.

CERN itself now receives more than 100,000 visitors a year, an exponential increase in recent times. Supported by more than 20 member states, it receives funding of around €900 million a year. It is immune from national jurisdiction but instead governed by public international law, so any legal disputes between it and its suppliers/contractors are solved via international arbitration. It also has its own procurement rules and procedures that differ from those in Europe. One such rule is the aim to ensure money flows back to the countries that support it by sourcing supplies from them wherever possible.

The Large Hadron Collider (LHC) is CERN’s most famous particle accelerator, but there are several projects happening at any one time. The procurement teams buy everything needed to build and operate the world’s largest and most complex scientific instruments, as well as anything else required to run the massive facility that straddles the French-Swiss border.
The 32-strong procurement team sources anything over a threshold of CHF100m, from catering and construction contracts to superconducting cable for the collider. “CERN is like a small city of 15,000 people,” says Anders Unnervik, head of procurement and industrial services. “It has 700 buildings, three restaurants, its own fire brigade and hospital, banks, post offices, two museums and a kindergarten. We have more hotel beds here than any hotel in Geneva.”

Twenty of his team are procurement officers dealing with orders and contracts with a combined annual value of CHF100m. CERN employees can make low-value, low-risk purchases directly using the contracts and templates already set up; but for bigger deals, they’re expected to see the procurement department, and “the sooner the better.” CERN’s requirements fall into three categories: standard, off-the-shelf, industrial products; non-standard products that can be produced with existing manufacturing techniques and/or technologies; and new high-tech products requiring a conceptual design phase, where industry lacks the expertise, experience or interest in developing them. In these cases, CERN is typically responsible for the development (also for the manufacturing and/or certification of these items) and issues build-to-print specifications to industry.

“Each category requires a different procurement strategy,” says Unnervik. “Sometimes our requirements are beyond the capabilities of industry and so we develop our own prototypes and products.” It is a compulsion that comes with working at the very edge of science. The CERN name can attract suppliers but it challenges even the smartest people off. Not only might the technology it needs not yet exist, sometimes the market isn’t willing to invest the time and money required to make it possible. This can lead to CERN designing its own prototypes or working alongside industry for many years to produce specifications side by side.

“The technology is on the limit of what is achievable commercially,” he says. “Our suppliers companies were more willing to take a long-term view. Today they’re shorter and shorter term, so it’s getting more difficult to get funding for research.”

For Unnervik and his team, “you cannot only work with one company; so we need close, long-term relationships.”

In the case of some cryogenic supplies, the technology has not yet been developed and can only be sourced if CERN is involved in the design and build process. “You have to be involved from the very beginning,” he says. “In high-tech it is the easier categories that can be a nightmare,” she says.

**SUPPLIER DEVELOPMENT**

In the case of some cryogenic supplies, the technology has not yet been developed and can only be sourced if CERN is involved in the design and build process. “You have to be involved from the very beginning,” he says. “In high-tech it is the easier categories that can be a nightmare.”

“Suppliers are very interested in doing business with us,” says Emanuela Berti, deputy head of procurement and industrial services. So, to boost competition and generate return for a member state, CERN worked with a European company, which is now, two years later, recognised as a competitor to the US business.

The procurement team has already picked up a European award for excellence and the innovation opportunities it offers suppliers. It has been praiseworthy, it said procurement processes, education of stakeholders, industry days for suppliers in member states and its work to market future requirements five to 10 years in advance.

For Unnervik, team flexibility and innovation in the procurement process are ultimate goals. “If a strategy does not work as planned because of unforeseeable conditions, you have to be prepared to change strategy. You also carefully evaluate the benefits versus costs related to dual sourcing, ensure competition throughout the entire bidding process and follow up contracts carefully.”

Working with a single supplier on some of its projects would be far too risky; so the team works hard to expand the market, reaching out to new and potential suppliers in a number of ways.

It has a supplier database and attends events in member states to connect with businesses – like next week, in Copenhagen. It also uses industrial liaison officers to help find suitable companies in those countries and reach out to global labs in other research labs for supplier contacts.

There is some collaboration between research labs, especially where they can make use of CERN’s size and experience, but teaming up for a member state, CERN it’s not enough – so we either have to build our own expertise or expand our own capabilities.”

And they’re not immune to cutbacks. While the team tracks savings and reports on them to management and member states, because it doesn’t buy the same things annually, it’s hard to compare year to year. Instead it takes the data and while it can add the most value and ensures it avoids becoming a bottleneck.

Needless to say, Unnervik and his team get a lot of job satisfaction from working at the cutting edge of science: “We’re proud to be part of it, most people here are.”

Lara adds: “One of our recruiting team has even been looking to work for the procurement team. She’s working on the team and wants to be part of the decision. Cristina Lara, deputy head of procurement and industrial services, says they may also pull engineers and physicists into negotiation rounds.

But it’s not necessarily the technical staff that is the thickest of it. “There are challenges in innovation but we buy anything you can imagine, so sometimes it is in the easier categories that can be a nightmare,” she says.

**CUTTING-EDGE PROCUREMENT**

For many of the specialists the items the procurement team has to work with it has to try to stimulate the supply market to generate competition. One area where it faces near domination by a single supplier is with electricity. “The supplier that has the biggest turnover with CERN is an electricity company,” says Unnervik. “We spend an awful lot of money on it, it’s almost a monopoly,” says Unnervik. “The power required to run the machines is equivalent to that of a small city. Its 200-megawatt daily requirement equates to 1.3 terawatt hours a year and while CERN does all it can to reduce power consumption, more than 90% of its bills is spent running the particle accelerators, so other measures have a negligible effect.”

CERN’s computer storage requirements are equally staggering. “We store 10 petabytes of data – that’s the equivalent of watching a 700-year-long high-definition film. The LHC alone creates more than 30 petabytes of data a year,” says Unnervik.

“We cannot expand our computer centre any more; it’s full. A few years ago we placed a contract for a computer centre in Hungary but with new experiments at CERN it’s not enough – so we have to build another centre elsewhere.”

So, to boost competition and generate return for a member state, CERN worked with a European company, which is now, two years later, recognised as a competitor to the US business.

The procurement team has already picked up a European award for excellence and the innovation opportunities it offers suppliers. It has been praiseworthy, it said procurement processes, education of stakeholders, industry days for suppliers in member states and its work to market future requirements five to 10 years in advance.

For Unnervik, team flexibility and innovation in the procurement process are ultimate goals. “If a strategy does not work as planned because of unforeseeable conditions, you have to be prepared to change strategy. You also carefully evaluate the benefits versus costs related to dual sourcing, ensure competition throughout the entire bidding process and follow up contracts carefully.”

Working with a single supplier on some of its projects would be far too risky; so the team works hard to expand the market, reaching out to new and potential suppliers in a number of ways.

It has a supplier database and attends events in member states to connect with businesses – like next week, in Copenhagen. It also uses industrial liaison officers to help find suitable companies in those countries and reach out to global labs in other research labs for supplier contacts.

There is some collaboration between research labs, especially where they can make use of CERN’s size and experience, but teaming up for a member state, CERN it’s not enough – so we either have to build our own expertise or expand our own capabilities.”

And they’re not immune to cutbacks. While the team tracks savings and reports on them to management and member states, because it doesn’t buy the same things annually, it’s hard to compare year to year. Instead it takes the data and while it can add the most value and ensures it avoids becoming a bottleneck.

Needless to say, Unnervik and his team get a lot of job satisfaction from working at the cutting edge of science: “We’re proud to be part of it, most people here are.”

Lara adds: “One of our recruiting team has even been looking to work for the procurement team. She’s working on the team and wants to be part of the decision. Cristina Lara, deputy head of procurement and industrial services, says they may also pull engineers and physicists into negotiation rounds.

But it’s not necessarily the technical staff that is the thickest of it. “There are challenges in innovation but we buy anything you can imagine, so sometimes it is in the easier categories that can be a nightmare,” she says.

**CUTTING-EDGE PROCUREMENT**

For many of the specialists the items the procurement team has to work with it has to try to stimulate the supply market to generate competition. One area where it faces near domination by a single supplier is with electricity. “The supplier that has the biggest turnover with CERN is an electricity company,” says Unnervik. “We spend an awful lot of money on it, it’s almost a monopoly,” says Unnervik. “The power required to run the machines is equivalent to that of a small city. Its 200-megawatt daily requirement equates to 1.3 terawatt hours a year and while CERN does all it can to reduce power consumption, more than 90% of its bills is spent running the particle accelerators, so other measures have a negligible effect.”

CERN’s computer storage requirements are equally staggering. “We store 10 petabytes of data – that’s the equivalent of watching a 700-year-long high-definition film. The LHC alone creates more than 30 petabytes of data a year,” says Unnervik.

“We cannot expand our computer centre any more; it’s full. A few years ago we placed a contract for a computer centre in Hungary but with new experiments at CERN it’s not enough – so we have to build another centre elsewhere.”

So, to boost competition and generate return for a member state, CERN worked with a European company, which is now, two years later, recognised as a competitor to the US business.

The procurement team has already picked up a European award for excellence and the innovation opportunities it offers suppliers. It has been praiseworthy, it said procurement processes, education of stakeholders, industry days for suppliers in member states and its work to market future requirements five to 10 years in advance.

For Unnervik, team flexibility and innovation in the procurement process are ultimate goals. “If a strategy does not work as planned because of unforeseeable conditions, you have to be prepared to change strategy. You also carefully evaluate the benefits versus costs related to dual sourcing, ensure competition throughout the entire bidding process and follow up contracts carefully.”

Working with a single supplier on some of its projects would be far too risky; so the team works hard to expand the market, reaching out to new and potential suppliers in a number of ways.

It has a supplier database and attends events in member states to connect with businesses – like next week, in Copenhagen. It also uses industrial liaison officers to help find suitable companies in those countries and reach out to global labs in other research labs for supplier contacts.

There is some collaboration between research labs, especially where they can make use of CERN’s size and experience, but teaming up for a member state, CERN it’s not enough – so we either have to build our own expertise or expand our own capabilities.”

And they’re not immune to cutbacks. While the team tracks savings and reports on them to management and member states, because it doesn’t buy the same things annually, it’s hard to compare year to year. Instead it takes the data and while it can add the most value and ensures it avoids becoming a bottleneck.

Needless to say, Unnervik and his team get a lot of job satisfaction from working at the cutting edge of science: “We’re proud to be part of it, most people here are.”

Lara adds: “One of our recruiting team has even been looking to work for the procurement team. She’s working on the team and wants to be part of the decision. Cristina Lara, deputy head of procurement and industrial services, says they may also pull engineers and physicists into negotiation rounds.

But it’s not necessarily the technical staff that is the thickest of it. “There are challenges in innovation but we buy anything you can imagine, so sometimes it is in the easier categories that can be a nightmare,” she says.