Smart PPE through Smart@fire

Readers of EST were introduced to Smart@fire, the European project that went looking for a Smart Personal Protective System (PPS) for firefighters, in the October 2013 issue of the magazine. Three years later, the project has presented its findings at a conference in Brussels.

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Smart@fire addressed two challenges: firstly, to increase the safety of firefighters by developing a 'smart' PPS, a need that was not being answered by a solution available on the market; and, secondly, to find out how effective Pre-Commercial Procurement (PCP) is to developing such innovative technology. The concrete case of the fire suits allowed the Smart@fire team to get down to the nitty-gritty of using PCP as a catalyst in innovation support: what works, and what doesn't?

Setting the benchmark

The need for increased safety of fire and rescue personnel is recognised by many governments and organisations. So far, however, the industry supplying the emergency services sector has insufficiently recognised existing technologies such as sensors, GPS and wireless data transfer as key enablers in increasing firefighter safety. It is clear that only new ways of applying technology and innovation can provide a solution to the challenges of public and personal safety in an increasingly complex world under increasing budget restrictions.

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Over the last couple of years, however, the Smart@fire project has succeeded in urging suppliers from all over Europe to develop smart firefighter gear. Two consortia of companies have been allowed to advance to the final stages of developing, testing and producing small batches of prototypes that can gather sensory, biometric and localisation data and relay them to a visual interface in the hands of a commanding officer.

Six months ago, the suits were tested in a controlled environment in a specialised firefighter training facility in the south of France. Evaluators, engineers and end-users were able to witness first-hand how the new gear performed in conditions that are as close as possible to reality. Eight firefighters from Belgium, France, Germany, and the UK (Greater Manchester) tested the prototypes, and together they were able to assure that the suits could meet specific user-needs and standard operating procedures of fire and rescue services all over Europe.

Neither of the solutions is currently available as an off-the-shelf solution – although one seems to be very close to commercialisation. Together, however, the two prototypes present new fire fighting technology. The industry now has a benchmark, against which other companies will hopefully want to measure themselves.

Lessons learnt

So-called 'market failures', ie situations in which market demand is not matched by a corresponding market supply, are not uncommon in services of public interest. In these sectors suppliers often lack the incentive to heavily invest in R&D and innovation. This is where Pre-Commercial Procurement (PCP) comes in. In PCP, public authorities use their considerable purchasing power to drive the demand side in such markets. By acting as 'first buyer' of new technologies and services, governments show their willingness to share the risks (and rewards) associated with private R&D investments. In a sense, the public sector shows, through PCP, that it can be less risk averse than the private sector. The open and phased approach of PCP also seeks to obtain better value for money and to avoid 'vendor lock-in'.

How effective is PCP?

Besides developing the smart gear itself, the Smart@fire team also learned valuable lessons about implementing a PCP. For one, the methodology entails that public and private organisations share the risks and the benefits of developing an innovative solution, but also the development process itself. This means that procurers need to exercise a certain measure of flexibility. While private companies that invest in R&D and innovation are usually accustomed to adjusting their course of action, public organisations often have a harder time adjusting to reality 'en route'. Private companies, on the other hand, often feel that their innovation processes are stifled by administrative procedures. This is why purchasers who are interested in PCP will want to have extensive legal expertise, in order to move swiftly through the project administration so that suppliers are left with enough development time.

In PCP you also need to strike a balance between radical innovation and feasible, marketable solutions

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within given constraints, or: between 'creating value' and 'capturing value'. Constraints are numerous: limited resources, legal requirements, the technology, market conditions etc. Sometimes this might lead companies to compromise on the potential for radical innovation and opt for a more feasible and commercially viable solution.

The road ahead

Challenges still remain on the road to commercialisation, such as obtaining certification, which can be difficult and expensive, especially when the certifying bodies have no framework to judge these kinds of innovations. Negotiations with notified bodies have commenced, but it could be a while before these result in a regulatory framework.

There is also the matter of 'preparing the market'. Selling a truly innovative solution to be used in day-to-day operations is not easy. Standard operating procedures will need to be revised and new functions and roles will need to be incorporated. Suppliers will need to work closely with the end-users in this 'transformation process'. One way of doing this is by first looking towards non-operational uses, such as training ('foot-in-door' strategy). There is no sense in 'dumping' these suits onto 'unsuspecting' end-users. This will only lead to a straightforward rejection of the new technology. Even if the benefits are very clear, firefighters in dangerous situations will first rely on intuition, routine and experience, and less on new technology, and rightly so.

As far as the actual prototypes are concerned, we still need to look at how we can make the suits even 'smarter' by making good use of the raw data they gather and transform these into true and useful 'intelligence'. Not all data is relevant at all times and for all purposes. Sometimes data will have to be combined, eliminated, qualified, cross-checked etc.

In the meantime, Smart@fire is getting procurers throughout Europe on board, informing them of the new technology and providing them with a template tender document. Smart@fire has made clear where PPE technology might go in the future, and both suppliers are keen to keep developing the suits, irrespective of current demand. Without a doubt we will see a much more advanced suit in the future. In the meantime, the bar has been set.

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