When research suggested to us that collaborative robots, originally designed for manufacturers in Asia and Japan, had been more of a hit in the mature European market, but had struggled to gain adoption in the Asia/Japan market, it was time to address some key issues that had been thrown up. The study showed clear differences between the markets, as outlined in the table below.

**Passion Road.**

How Mitsubishi Electric successfully adapted their new range collaborative robots to the challenges of the Asian market

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<table>
<thead>
<tr>
<th>Differences in human cost</th>
<th>Europe</th>
<th>Asia including Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher employment costs make management reluctant to hire more people and more willing to introduce collaborative robots.</td>
<td>Lower employment costs make management reluctant to utilize collaborative robots over people.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Differences in robotics know-how</th>
<th>Europe</th>
<th>Asia including Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term interest in robotics has helped to embed robotics utilization know-how in many European companies.</td>
<td>Robotics utilization in Japan has been limited to large enterprises with sufficient engineering expertise. Robotics has been difficult to establish in SMEs with comparatively few specialist robotics engineers.</td>
<td></td>
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<th>Differences in thinking</th>
<th>Europe</th>
<th>Asia including Japan</th>
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<tr>
<td>While collaborative robots have not been cheap they were introduced at a range of manufacturing sites for customers who would otherwise lack full-time engineering expertise.</td>
<td>In mid-sized companies that lackledrobot engineers, barriers such as system design and start-up and costs became a bottleneck, making introduction limited.</td>
<td></td>
</tr>
</tbody>
</table>
Collaborative robots are not just an extension of industrial robots

At our Policy Meeting of June 2017, it was broadly agreed that collaborative robots were actually much more than just an extension of industrial robots. At this point, we decided to embark on development of a prototype for the International Robotics Exhibition in Tokyo – happening in just three months’ time.

Safety at all costs

Safety is a huge consideration – and one that makes collaborative robots significantly different from conventional industrial robots. With robots operating within the operating spheres of workers, we considered it essential that we develop a mechanism based around international standard ISOITS 15066, ensuring conflict with people could never occur. Key to this challenge was to develop a sound understanding of potential risks between ‘moving people’ and ‘robotics’.

User-friendly programming tools

We also saw it as essential that anyone should find it easy to learn to control the robots – via programming tools which are conscious of consumer design and which can be accessed via touchscreen or operated via voice recognition.

Teaching attachment

Much thought was needed on the area of teaching. Although this could be offered via button operation at a terminal, it could never be as satisfactory as giving people the ability to move the arm of the robot by hand. Our eventual answer was to develop a removable ‘teaching attachment’ sandwiched between the robot arm and the hand – which would then have both functions.

International Robotics Exhibition, November 2017

“As a developer, I want to listen to customers’ voices and directly feel their evaluation of the products we made,” said Daisuke Terada, MELFA ASSISTA Team Leader. However, at the International Robotics Exhibition, our prototype was met with mixed responses. While the programming tool RT Visual Box was very well received, the same could not be said of teaching attachment. It was pointed out by many interacting with the robot that it stopped the folding arms moving freely and also that when the arms moved up, the screen could become difficult to read. We therefore made the decision to discontinue the attachment’s development. And so, at last, in October 2018, specifications of the co-operative robots were finalized.

Overcoming a weight issue

The engineering sample for was completed in June 2019. Objective evaluations by distributors and users made one point very clear to us, however. Everyone said it felt heavy when they moved the robot arm during direct teaching. Riku Sugawara, from Nagoya Works Robot Section undertook further face-to-face research and commented “We had to understand the situation from the customer’s point of view. And you cannot do this without asking people.”

“The problem was the theoretical value calculated on the desk did not match the measured value of the robot.”

Rintaro Haraguchi, Engineer, Robot System Group.

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MELFA ASSISTA “Direct Teaching” instructions can be easily entered using the key pad at the top of the arm. Since the time of launch, the easy-to-use functions of MELFA ASSISTA have begun to attract many companies in the Japanese small and medium-sized manufacturing industry – enabling them to overcome many of the market issues mentioned at the outset. The passionate developers of Team MELFA ASSISTA continue to drive towards an ever-developing future of human-robot collaboration.