

Summary of CMSE end-user-needs analysis (Russia, Malaysia)

1. General conclusions

Executed CMSE end-user-needs analysis in Russia and Malaysia shows the need for qualified experts in the CMSE field, meeting modern requirements of the labour market, prepared by higher education institutions of partner universities (HEI).

In the partner countries, there are requirements in training of bachelor's and master, as well as in retraining (advanced training) of existing experts in the CMSE field.

Along with this, the need for CMSE specialists in partner countries - Russia and Malaysia are rather different, that is shown by conducted analytical reviews.

Thus, in Russia more than 72% of enterprises, and in Malaysia - more than 54% are planning to introduce in the near future new technologies in the field of CMSE, where qualified personnel will be required.

At the same time in Russia needs for bachelors and masters are approximately the same, Malaysia primarily require bachelors (59%).

Regarding to retraining and skills rise of CMSE experts, in both partner countries demand is about the same and amounts to nearly 80%.

According to specifics of CMSE experts in partner countries end-users requirements are different.

If Russia needs more experts, who can work with already developed models (Operate models), in Malaysia is equally in demand professionals who can both develop mathematical models (Develop models) and work with developed ones (Operate models).

If we talk about types of models that are most commonly used in enterprises, for Russia they are models developed with the use of modelling software packages (43%) and models that are developed with the use of high-level algorithmic languages (36%), for Malaysia – these numbers account for 52% and 33% respectively.

This suggests that models created by using modeling software packages are demanded at first place.

Thus both in Russia and Malaysia the need for specialists, capable of working with operating models, created “on customer order” with use of modelling software packages or by own company specialists is the highest.

In terms of using specific mathematical packages in end-user companies, the survey shows first for both partner-countries such packages as Maple, Mathematica and MathCAD.

The survey under section "General issues" shows the following.

Qualification requirements of the State educational standards related to computer modelling and Professional standards not fully correspond to each other. Therefore, both in Russia and in Malaysia it is necessary to work on establishing consistency between these standards.

Training of CMSE specialists by universities is appreciated by end-users as satisfactory. At the same time enterprises in Malaysia are showing some interest in organization of industrial

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affiliated departments and laboratories of the universities in practice-oriented process of training specialists demanded by the enterprise (75%), in Russia this figure accounts for 48%.

Regarding to particular personal qualities and practical competences for a specialist in the sphere of computer modelling, survey results in Malaysia and Russia are close to each other.

The carried out CMSE end-user-needs analysis showed following:

- In Industry and Education there is a need in engineers, specializing in modelling and simulation.
- 80% of questionnaire stated the demand in new specialists. In RU the demand for MSc is higher than for BSc, in MY the need for BCs is higher. The enterprises in RU also show interest in the PhD specialists.
- The quality of graduate students does not correspond with demands of stakeholders at the moment.
- Russian universities are traditionally strong in training physic-mathematical specialists and not so good in training engineers in the field of modelling and simulation.
- The training of engineers in modelling and simulation should be reformed and coordinated with up-to-date demands of industry, special attention must be paid to the practical skills in CMSE.

Thus, it can be concluded that the analysis results of CMSE end-user-needs in partner countries tells about the timeliness and necessity of the project