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• Simulation Integration Management

Pilot survey

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Introduction

Research on the role of engineering simulations during the product lifecycle from an organizational, strategic and communication perspective is very limited if existing at all. Available research is often focused on technical integration or the results of simulations on company performance, but not how to get there and what actions are efficient and what actions are wasteful. Typically simulations have been introduced as an additional or replacement technology at a small scale and grown from there; hence both the technology integration and understanding from other functions is often limited.

Figure 1: From Addition to Replacement to Integration

The purpose of the survey presented here has been to gather initial data and an understanding and time stamp of the situation for engineering simulations in the industry from a human interaction perspective, but also to develop questions to better unveil the underlying mechanisms that determine how well embedded simulations are in the product lifecycle.

A total of 39 respondents replied to the survey and about 20 comments were given about further challenges for simulation activities in the industry, suggestions for other questions and descriptions of simulation usage not covered by the survey.

Most respondents are based in the Nordic region with the exception of three respondents based in Asia and Australia. The industry participation was quite broad with respondents from most industries, automotive was the main industry participating with about 1/3 of the respondents. About half of the respondents came from companies with more than 10.000 employees.

Respondents were mainly simulation team managers (31%) or product development managers (24%) together with simulation vendors (20%). Further respondents included IT, marketing and innovation managers, senior simulation users and consultants.

Strategy

The role of simulations seems to be strong as more than 90% believe engineering simulations is part of the overall strategy for the company, see figure 2
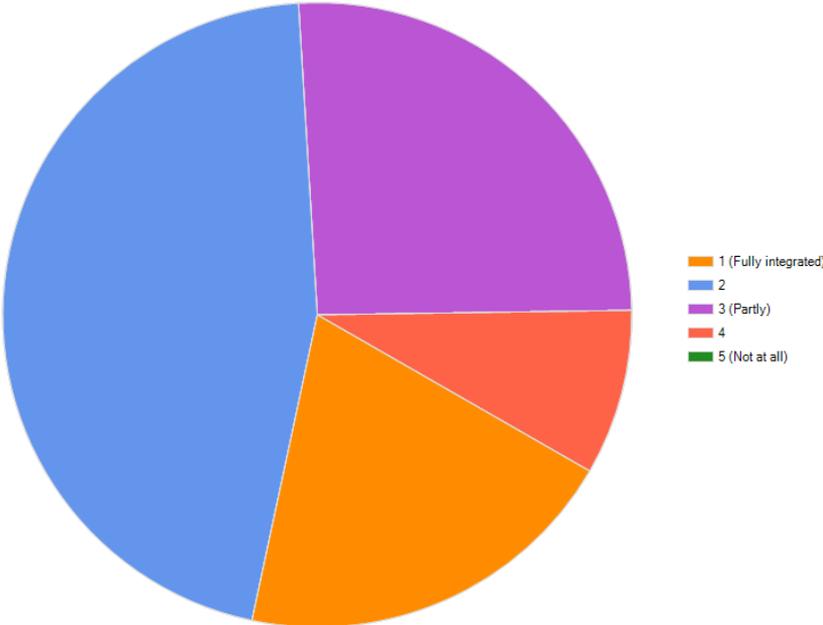

Figure 2: Engineering simulations as part of the overall product or process development strategy

From the survey it seems the main driver for engineering simulations is to gain a deeper understanding of product behavior (42%) together with shorter time to market (26%) and quality improvements (19%). Figure 3.
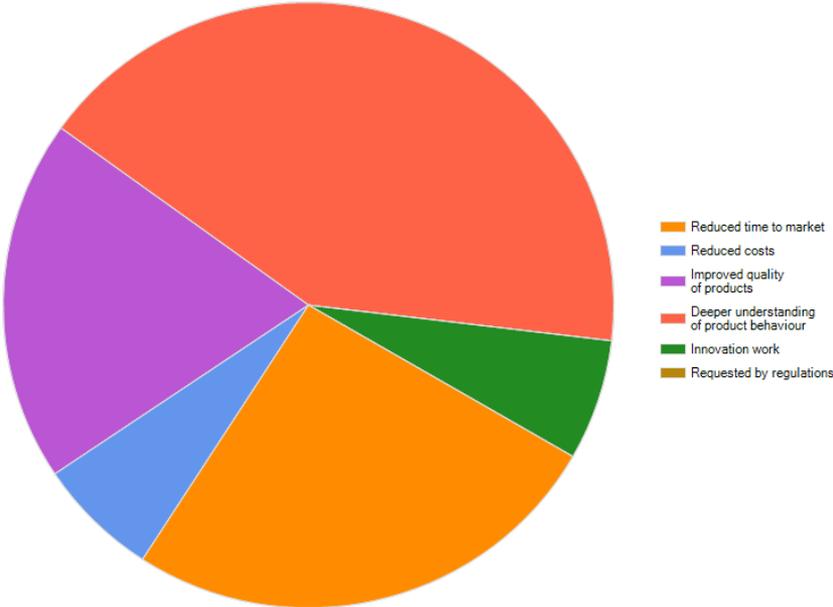

Figure 3: Main reason for using engineering simulations

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The timing of simulations in Figure 4 covers the full lifecycle of the products, from early innovation stages, through product development to customer specific simulations in sales situations so there is no clear indication that simulations are used mainly at a certain stage but rather that its use has evolved differently at different companies.
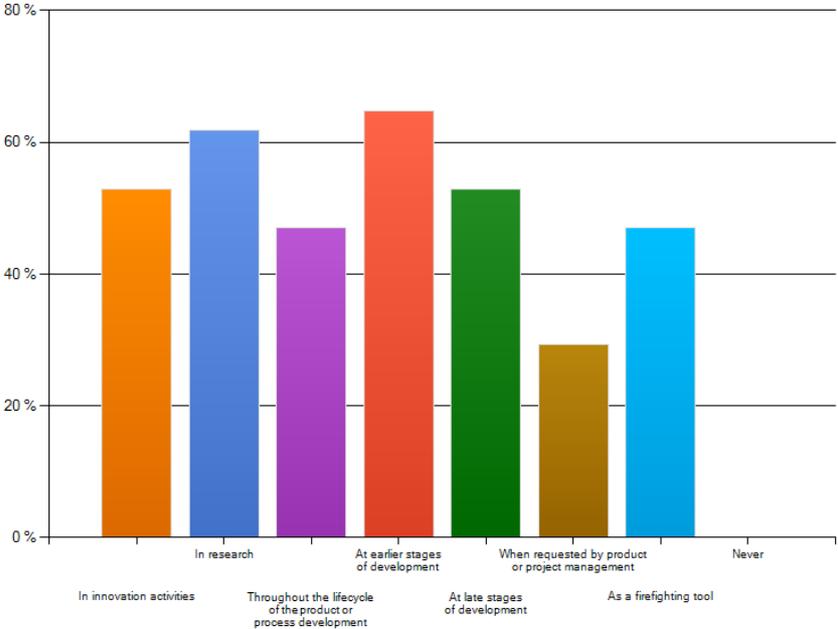

Figure 4: Simulation usage

Among those who answered the question about overall product development management guidance, lean product development was in clear majority with about 30% of all respondents. Agile product development and design for six sigma were listed by about 10% each, but there were also several comments that this was an ongoing topic at their companies.

Organization

The next step was to look at the way engineering simulations are integrated in the company from an organizational point of view. In Figure 5, about 50% of the participating companies utilize simulations through dedicated teams, whereas 30% have fully integrated engineering simulations in their overall organization. 20% operate with distributed simulation teams. Obviously, certain parts of simulation work are outsourced to consultants and this is often an important part of the simulation usage. Several respondents commented this fact.
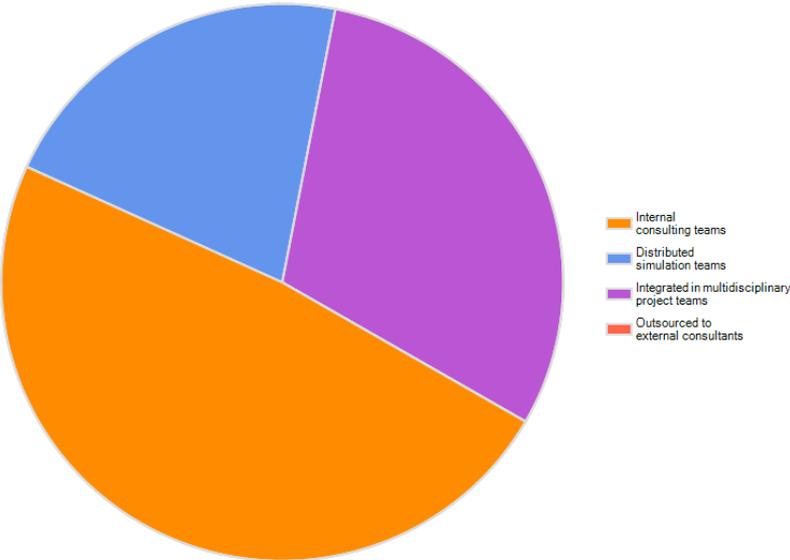

Internal consulting teams
Distributed simulation teams
Integrated in multidisciplinary project teams
Outsourced to external consultants

Figure 5: Organization of simulation activities

Decisions about simulation technology investment is evenly distributed between different levels and there is no clear pattern, as is illustrated in Figure 6. It seems 40% decide on a company or corporate level, and the other 60% make more local decisions within a project or simulation team.
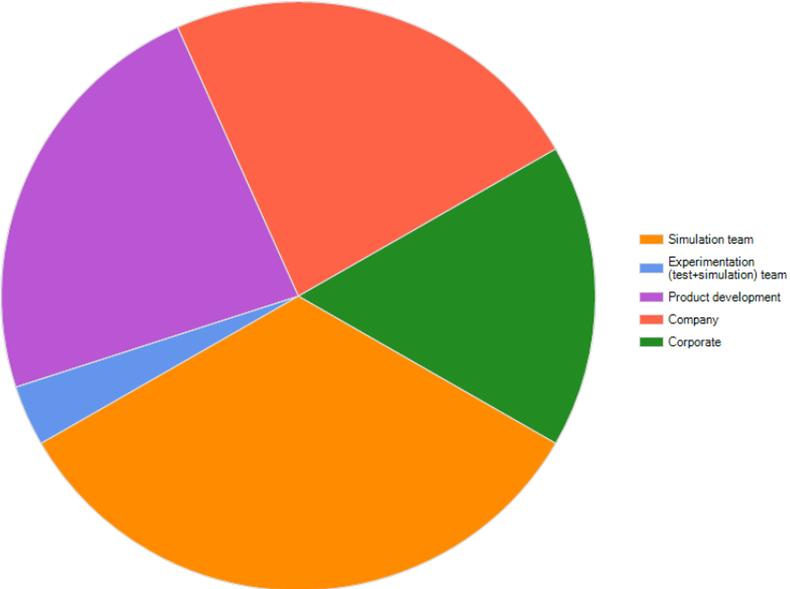

Simulation team
Experimentation (test+simulation) team
Product development
Company
Corporate

Figure 6: Level of decisions about simulation technology investments

Communication

The last set of questions related to the current situation focused on communication between simulation teams and other functions at the company. Communication with top management seems to be most challenging and an area where improvement can be made, see Figure 7. Considering that simulations are often part of the companies overall strategy (see above) this is an area which should be paid further attention.
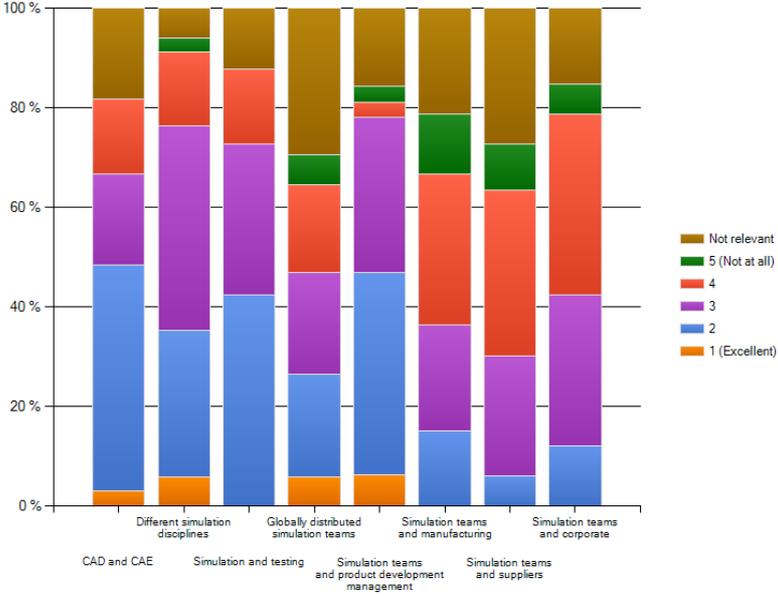

Figure 7: Efficiency of different communication channels between different functions

In Figure 8, it can be noted that the methods for collaborating with other simulation teams are less of a technical issue than it's an interpersonal communication issue. Meetings in all forms are used more than technology solutions for exchange of information, experience and knowledge
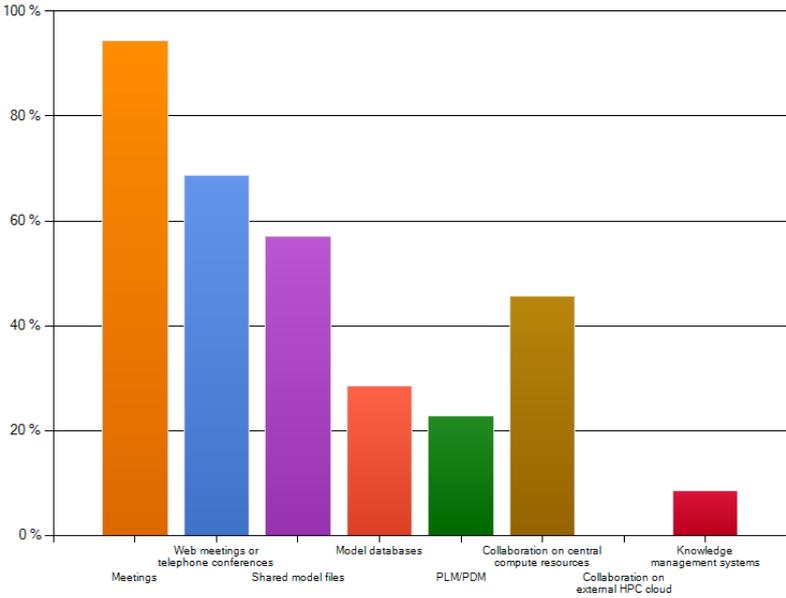

Figure 8: Methods for collaboration between different simulation teams

Future outlook

Finally, the respondents were asked to grade the importance of improved communication and tools for improving the role of simulations within their respective company, Figure 9 and 10. An interesting point is that communication with corporate and project/product management is clearly priority issues, almost 90% think it is very important or important to improve these communication channels. The need to move simulations further upstream in the development process together with better communication between simulation disciplines is following.
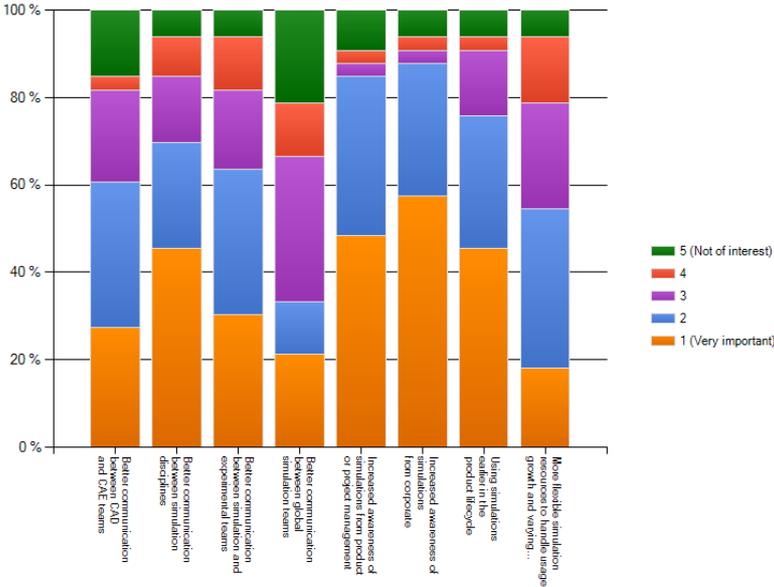

Figure 9: Changes needed to facilitate increased usage of simulations

The preferred way to deal with the communication issues above and other means to support increased usage of simulations is to formulate best practices in the area of simulation integration management, followed by benchmark studies and establishment of a simulation integration network as illustrated in Figure 10.
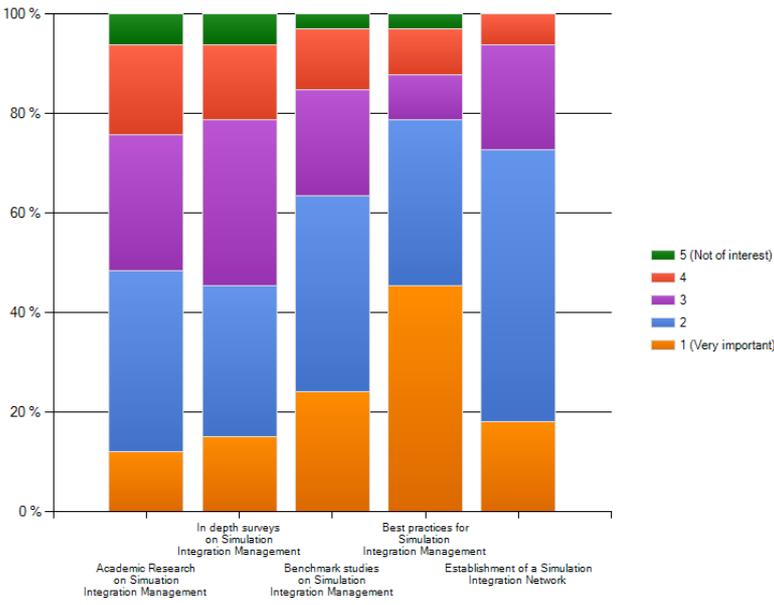

Figure 10: Importance of possible future activities to support simulation ambitions

Conclusions

The survey is based on a limited number of respondents but there are some trends that can be observed that align well with ongoing discussions in the industry and recent studies by Bigjump in other settings. Clearly the communication with senior management and project or product management requires attention and methods to help achieving this should be developed.

A workshop on Simulation Integration Management was run in Gothenburg on May 6-7, 2013 with 22 participants. With the survey and the workshop as input, a forum for simulation integration management is currently being set up by Bigjump AB which aims at carrying out research, developing good practices, benchmark studies and a common language for simulation integration management. Furthermore, the formulation of a value proposition for simulations will be a priority.

A LinkedIn group under the obvious name "Simulation Integration Management" has also been set up and welcomes new members on a "request to join" basis.

More information about the forum and future activities will be found on www.bigjump.se