

Research Report



Trends and Outlooks for New Product Development: Is R&D in Danger?

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Introduction

As products become more complex and development teams grow increasingly global, today's companies are struggling more than ever to profitably deliver innovative products. R&D, engineering, and design departments today have been buffeted by the challenges of outsourcing, global customers, industry consolidation, layoffs and rising product costs. To overcome these challenges, companies have tried implementing various technologies and processes to improve innovation in the past several years.

But which trends are endangering today's R&D organizations and which are hidden opportunities? Which initiatives have proven the most successful in making market leaders? And what really separates innovation leaders from innovation laggards?

CA recently conducted a survey involving over 100 respondents from diverse industries to cut through the hype and understand what some of today's leading development companies are doing to overcome key R&D challenges.

Key Findings

CA's survey asked respondents what their views and opinions were on overall trends in R&D, key development issues they're facing, and technologies and initiatives they are pursuing to overcome challenges in product development.

The survey respondents came from a variety of industries, including high-technology, transportation and financial services.

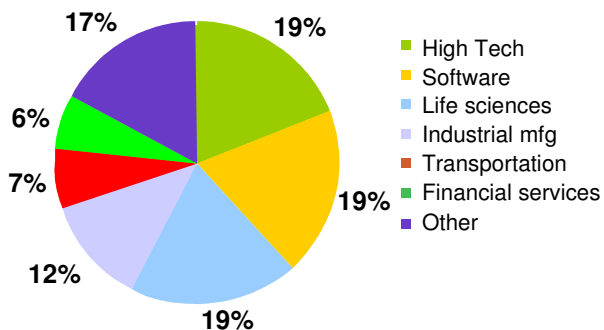


Figure 1: Industry breakdown of respondents

The majority of the survey respondents came from high-technology (consumer electronics, telecommunications, etc.), software (applications, internet, computer services, etc.), and life sciences

(pharmaceuticals, medical devices, etc.) – each with 19% of the respondent population.

In terms of company size, the survey respondents came from all size companies, with almost 40% coming from large organizations (greater than 5000 employees).

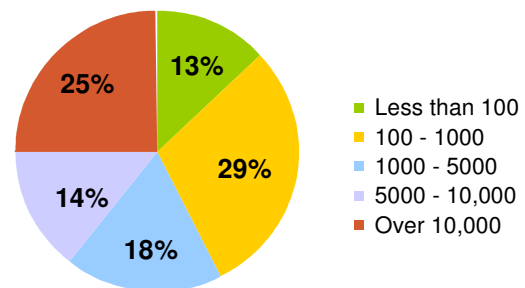


Figure 2: Company size breakdown of respondents

Though new product development organizations face many challenges, the survey extracted several key themes that were prominent across multiple industries:

- **Theme 1:** Despite all the recent news on outsourcing and globalization, most respondents felt that outsourcing did not have much of an impact on their R&D organization. Other issues, such as customer involvement and cost reduction, were much more important.
- **Theme 2:** Companies are still having major issues delivering products on time, and the biggest single cause was the inability to find and staff people on R&D programs.
- **Theme 3:** Many technologies have helped companies improve their R&D processes, although project and portfolio management was the most frequently implemented and most successful technology investment for all respondents.

The survey findings strongly suggest R&D organizations need to spend less time worrying about the “danger” of outsourcing and more time on working closely with their customers. With the multiple dangers and challenges facing R&D, companies need to address the most critical issue – getting better insight into their development resources – and determine which business initiatives and technologies will help them exceed their customers' expectations.

Theme 1: Beyond the Outsourcing Hype

Much of the news today regarding new product development has focused on outsourcing and globalization. As service-related jobs begin to move overseas, many people in research, design, and software development jobs are worried that their job will be the next one outsourced to overseas contractors.

But outsourcing has been occurring in product development for decades, especially as contract manufacturers have moved more upstream to deliver design services in addition to their traditional manufacturing services. So how real of a danger is outsourced R&D?

While outsourcing is an important trend, the survey respondents noted that there were two other trends that were much more significant to their R&D organizations – 1) increased customer involvement in the R&D process and 2) continued pressure to reduce R&D costs.

Most Important R&D Trends

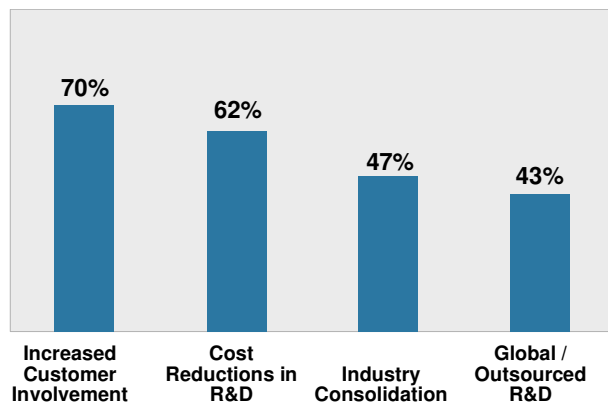


Figure 3: Percentage of respondents indicating which trend had significant or major impact on their R&D

In fact, 70% of respondents felt increased customer involvement was a significant or major trend in research and development, compared to just 43% who felt global and outsourced R&D was a key trend.

The average respondent score for these trends paints a similar picture. In this case, industry consolidation received the lowest overall score, but increased customer involvement still is the most significant trend. Compared to globalization and outsourcing, it received an average score of 2.87 versus an average score of 2.43 for globalization

and outsourced R&D. (On a scale of 1 to 4, with 4 being the most critical).

Relative Importance of R&D Trends

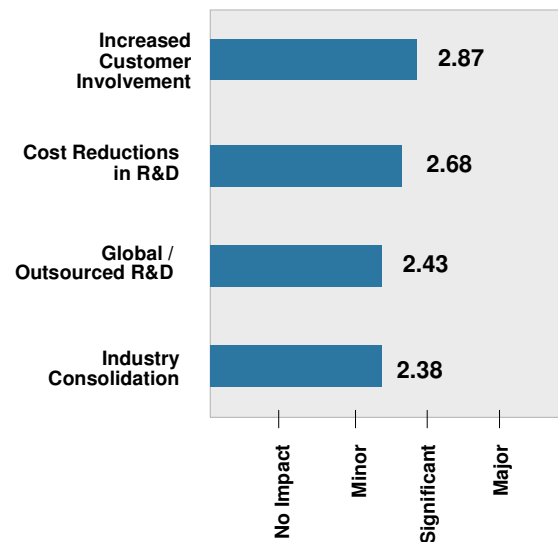


Figure 4: Average score for R&D trend based on respondents

Increased Customer Involvement

Why do almost three-fourths of the survey respondents feel that increased customer involvement substantially affects their product development organization?

Many years ago, customers were generally more involved only at the beginning and end of the development cycle – providing their requirements up front, and then receiving the final product at the end. Today's customers are generally more involved in all phases of the R&D process. Many customers now expect to be treated as an equal development partner. Customer involvement has increased in the level and frequency of participation – from design reviews to real-time status updates to early prototype access.

Increased customer involvement can be attributed to several reasons. First, closer collaboration with customers can lead to faster time to market and fewer change orders. Second, quality improvement programs and CRM-related initiatives have given added emphasis to Voice of Customer (VOC) programs. VOC has raised expectations for both sides of the customer relationship to be more engaged with each other. Finally, corporate governance pressures have caused many companies to be more concerned about their suppliers' business processes and to demand greater insight and visibility into how their suppliers operate. Corporate governance may explain why

increased customer involvement has become most prevalent in the financial services industry, for example.

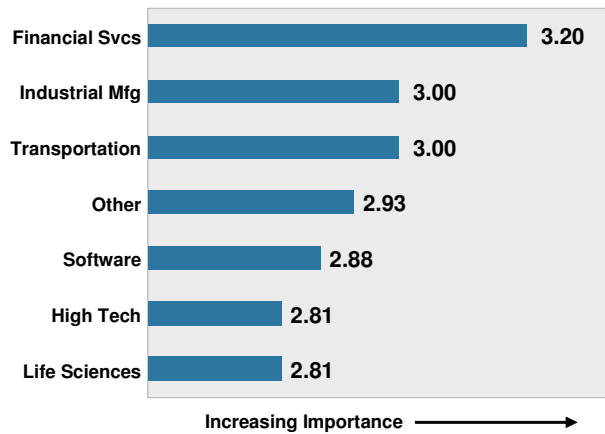


Figure 5: Average score per industry for trend of increased customer involvement

What is surprising about the industry breakdown is that both the life sciences and high-tech verticals rated increased customer involvement lower than all other industries. This may be attributed to the fact that both industries have always had a high frequency of customer involvement in their product development processes.

Cost Reductions in R&D

The second most notable trend among the survey respondents was the constant pressure to reduce costs. Over 60% of the respondents felt that cost reductions had a substantial impact to R&D. The importance of this trend is no surprise, considering the media attention on outsourcing, downsizing and the slow economic recovery.

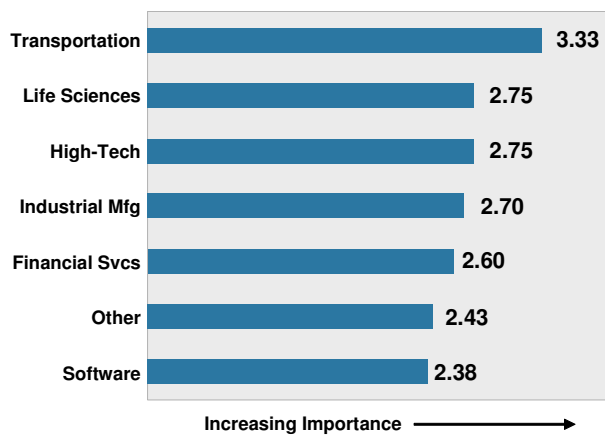


Figure 6: Average score per industry for trend of cost reductions

Of all the industries surveyed, software development firms rated cost reductions as the least important

(average score of 2.38). This could be attributed to the relative immaturity of the industry and the lack of direct material costs for its products. With people as their main cost driver, software companies need to be able to get more value and productivity out of their talent pool.

The transportation industry (including aerospace and automotive) has been most impacted by cost reductions. With an average score of 3.33, transportation companies rate this trend almost 40% more important than the overall average. This is not surprising considering the issues that have been plaguing this industry for the last several years.

Outsourcing Surprises

Despite all the news and hype about outsourcing, survey respondents ranked it as the least important trend affecting R&D. Of all respondents, almost 60% felt that globalization and outsourcing had little or no impact on their company.

Outsourcing Impact on R&D

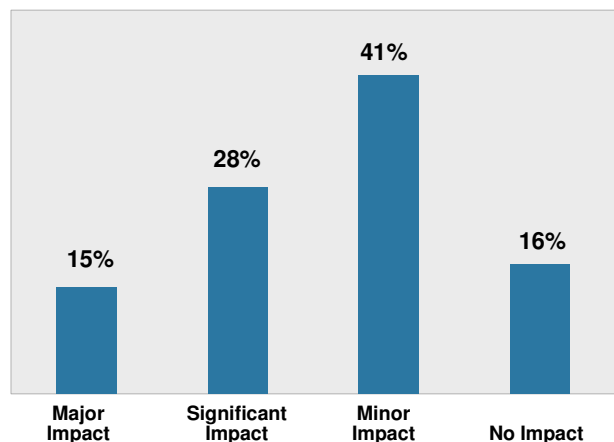


Figure 7: Percentage of respondents indicating the impact of globalization and outsourcing on R&D

In fact, less than 1 in 5 respondents felt that their outsourcing relationships with their R&D partners were successful.

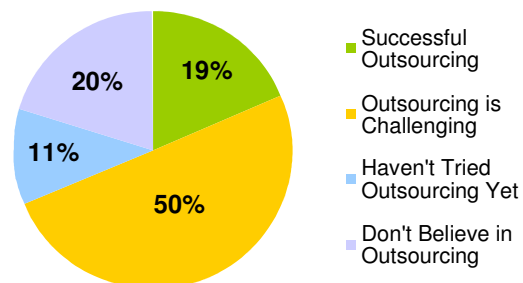


Figure 8: Percentage of respondents with successful outsourcing

One of the most surprising facts from the survey was that despite all the media attention on outsourced software development, the industry with the lowest level of outsourcing was the software industry (average score of 2.06).

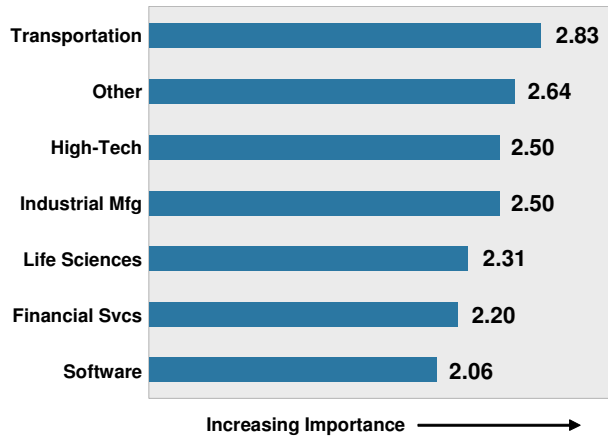


Figure 9: Average score per industry for global outsourcing trend

Even though outsourcing is not the biggest trend impacting product development, it should not be ignored. The 20% of companies who indicated that they were successful in outsourcing scored much higher in various product development metrics.

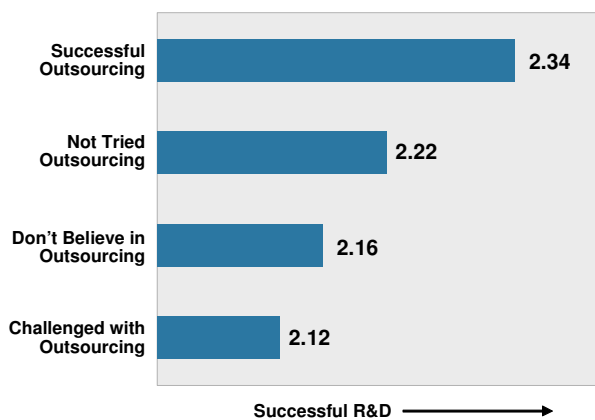


Figure 10: Average score for various R&D metrics based on respondents' outsourcing success

What is significant about these results is that companies who found outsourcing challenging scored the lowest in various R&D metrics (average score of 2.12). However, companies who scored the best in managing their outsourcing relationships had significantly better scores for the same R&D metrics (average score of 2.34).

Another significant fact is that of the top ten respondent scores for successful R&D, seven of them rate themselves as having successful outsourcing relationships.

In conclusion, companies should be wary of spending too much time on the overhyped trend of outsourcing and ignoring the more critical trend of increased customer involvement. Outsourcing should be objectively prioritized against all the other key challenges, trends and dangers an R&D organization faces.

Theme 2: Focus on People

Against a backdrop of several significant trends, how have companies performed and what are the most challenging issues they face? Survey respondents were asked to rate nine challenges and issues that many development organizations face today.

While R&D investment was rated as the least important issue for survey respondents, over 85% felt that finding available resources was the biggest issue facing their development organization. So while many companies may have enough people to do work, they lack the ability to identify and deploy those very people they hired.

Top R&D Challenges

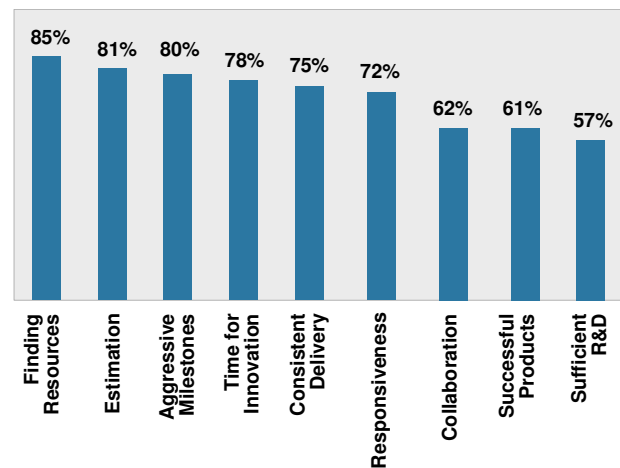


Figure 11: Percentage of respondents rating certain R&D issues as major or significant challenges in their organization

Similarly, the inability to find resources seems to be a strong contributor to other top development issues – difficulty in estimating, planning and delivering development projects (81%), commitment to aggressive or unrealistic milestones (80%), and allocation of enough time in their workday to be innovative (78%).

The survey responses strongly suggest that there is a great difficulty for many R&D companies to understand what their development resources are doing – what projects they're working on, how long they spend on certain tasks, and how much time

they have for additional work. For these organizations, the problem is not “doing more with less” but rather “doing more with what you have.”

If R&D organizations are better able to understand their people’s skills, availability and overall capacity, there is a strong likelihood that they will be able to address some of their key issues. While creating a complex project plan is no easy task, it is even more difficult to determine how realistic the times and milestones are based on the capacity of the people working on the project. Likewise, as deadlines shift during development, understanding people’s skills and work capacity is critical for being able to re-plan and determine updated milestones.

Industry Leaders

While all industries who were surveyed were challenged by various R&D issues, the industrial manufacturing and financial services industries fared the best. Industrial manufacturing had an overall average score of 2.38, while financial services had an average score of 2.30. The relative maturity of these industries versus others could account for their better scores.

Industry Comparison for R&D Metrics

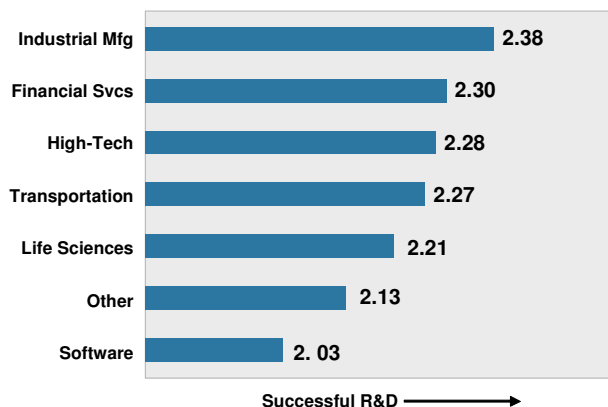


Figure 12: Average industry score for various R&D metrics

The industrial manufacturing sector scored the highest only for customer responsiveness (2.60) and did better than the overall average for all other issues. The financial services industry was the industry that scored the highest for the most R&D challenges. It scored the highest for estimating, planning and delivering projects (2.60), adhering to realistic milestones (2.60) and having enough time to be innovative (2.60). However, its lower than average scores for customer responsiveness (2.00) and investing sufficiently in R&D (2.00) brought down its overall score.

Software Struggles

Of all the industries surveyed, the software industry had the lowest overall score (average score of 2.03). For the nine R&D issues surveyed, the software industry scored below the average in eight of those categories.

In fact, the industry had the lowest scores for all industries in five areas: committing to aggressive and unrealistic milestones (1.31), finding available resources (1.44), estimating, planning and delivering projects (1.50), having enough time to be innovative (1.75), and responding to customers (1.88).

Software Industry R&D Struggles

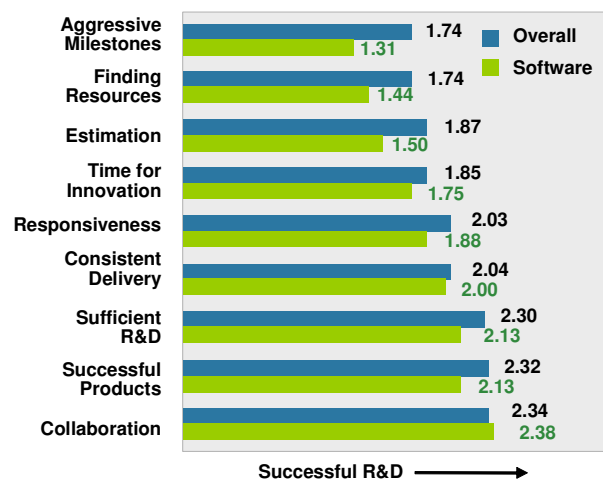


Figure 13: Average scores for various R&D metrics for software industry and overall average

In fact, the only category where the software industry performed slightly better than the average was collaboration with other employees, suppliers and partners (2.38 vs. the industry average of 2.34).

The low score from the software development industry is not surprising considering the level of maturity of the industry compared to others, like industrial manufacturing. Also, new technologies and changing standards arguably impact this industry more than the others. No matter the reason, the scores clearly indicate that the industry must continue its development of predictable software development processes in order to achieve success in R&D.

Survey respondents clearly indicate that all product development organizations must focus on people to achieve R&D excellence. Regardless of industry maturity, having greater insight into development resources is essential for meeting customer commitments and working more effectively.

Theme 3: Project and Portfolio Management to the Rescue

Considering all the industry trends development organizations are facing, what have they done to overcome their biggest R&D challenges? Survey respondents were asked to rate business and technology initiatives their companies have tried.

Business Initiatives in R&D

In terms of business initiatives, organizational structure changes has been the most frequently done (74% of respondents), far outpacing outsourcing (42%).

Most Implemented Business Initiatives

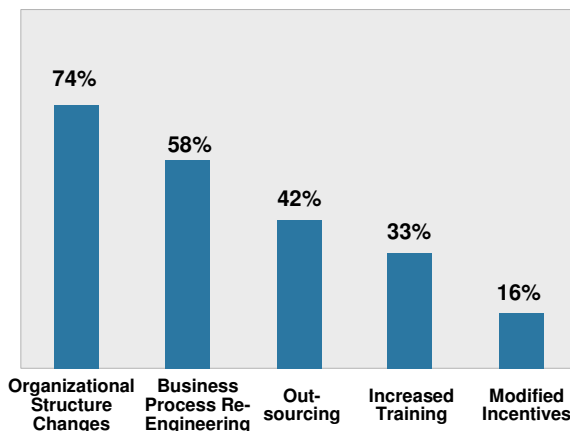


Figure 14: Percentage of respondents indicating which business initiatives their companies have tried to resolve R&D challenges

In terms of which initiatives were successful, the results were very similar. Of the 60 respondents who indicated that they had tried business process reengineering, 32 of them found it successful – giving it the highest success rate of all business initiatives at 53%.

Organizational structure changes and outsourcing were close behind at 47% and 43% respectively. Considering the amount of organizational upheaval those two initiatives can cause, their high success rate speaks very highly for their impact on R&D.

Most Effective Business Initiatives

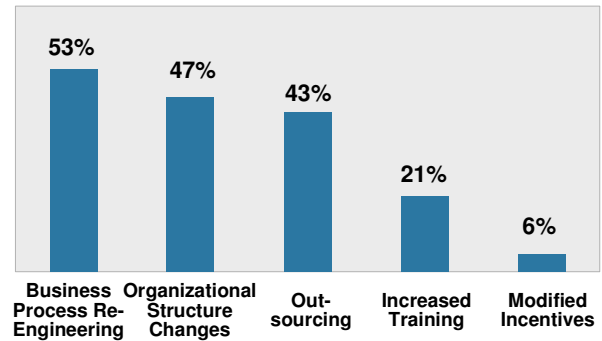


Figure 15: Percentage of respondents indicating which business initiatives they tried were most successful

What's significant about these results is the juxtaposition of business process re-engineering and organizational structure changes with the top-rated R&D challenge of finding available resources. With people shifting roles and responsibilities in almost three out of four companies, it is imperative that a successful R&D organization take a proactive stance in being able to find the right and available people for development work. Since business process re-engineering is also so prevalent, companies need to standardize best practices as people find themselves in new positions, so that R&D projects continue to be delivered successfully.

Project and Portfolio Management Success

Technology is also a key part of the solution in resolving major R&D challenges. Project and portfolio management (PPM) has been the most frequently used technology (69% of respondents), outpacing document management (48%) and product lifecycle management, or PLM (44%).

Most Implemented R&D Technologies

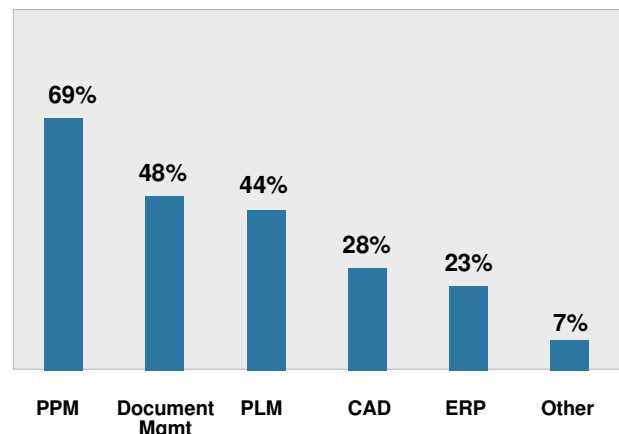


Figure 16: Percentage of respondents indicating which technology initiatives their companies have tried to resolve R&D challenges

In terms of which technologies were successful, there was little correlation between technologies tried versus technologies that were successful. In fact, of the top three attempted technologies, only PPM showed a high success rate – 48 of 72 respondents, or 67%, indicated that it was the most successful technology initiative they undertook.

Another interesting finding is that of the ten top-rated respondents, four of them identified PPM as their most successful technology initiative (CAD was second, with two respondents feeling it was the most successful technology initiative they tried).

Most Effective R&D Technologies

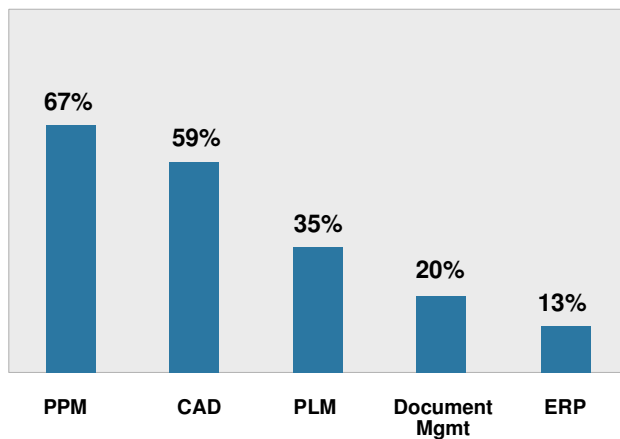


Figure 17: Percentage of respondents indicating which technology initiatives they tried were most successful

On the other hand, PLM and document management proved to be much less successful, with success rates of 35% and 20% respectively. These results suggest that while document management and PLM may help with certain development processes, they may not be as critical in resolving key R&D challenges in a timely manner.

While many technologies have proven to be effective in helping R&D organizations, PPM likely has a high success rate because it generally manages the most critical aspects of development – resources, timelines and deliverables. However, considering that 85% of respondents still had significant or major issues finding available resources, this strongly suggests that there remains much more to be done with PPM beyond project plans and budgets. R&D organizations who wish to use PPM should strongly consider a solution that allows them to resolve the most critical aspect of development – their people.

Summary

Much attention has recently been paid to globalization and outsourcing in R&D. However, the respondents to the CA survey on new product development trends clearly point out that R&D organizations should be focusing on the more critical trend of increased customer involvement in the development lifecycle.

Increased customer involvement in development is a double-edged sword that must be handled well by development companies. While it allows companies to develop better products through tight customer engagement and early feedback, it also requires constant communication and real-time visibility to satisfy customers and achieve product success. Poorly managed customer interactions have a high probability of leading to lower customer satisfaction, no matter how good the final product is.

Complex R&D challenges make it increasingly difficult to meet customer expectations. In order to be successful at R&D, companies – especially those involved in software development – must be able to predictably and efficiently plan, execute and deliver their development programs. Since finding available resources is the single largest issue facing survey respondents, R&D organizations must place a top priority on the ability to quickly identify and deploy the right people for their development work, based on their skills, qualifications and availability.

While project and portfolio management has been the most successful technology initiative for resolving R&D challenges, companies need to make more effective use of it. Because of the triple challenges of organizational structure changes, business process re-engineering and resource availability, development organizations should take advantage of broad PPM solutions that have strong resource management and capacity planning capabilities.

So is R&D really in danger? There is no doubt that even the best development organizations are beset by multiple challenges and threats. But by addressing the most critical development trends, focusing on people, and implementing the appropriate technology and business initiatives, R&D organizations will be well positioned to achieve success in today's marketplace.

Appendix

Methodology

The survey was posted on the company's website, and responses were submitted online. Physical copies of the survey were also distributed at various product development conferences for respondents to fill out by hand. All respondents had the option to submit their responses anonymously. A total of 109 respondents filled out the survey, and the complete results of responses are available upon request. Of the 109 respondents, only 13 were current customers of the Clarity product from CA (less than 12%).

Terms & definitions

- PPM: Project and Portfolio Management (PPM) tools manage project plans, resources, deliverables, actuals, project financials, and deliverables. Popular PPM tools include CA's Clarity and Microsoft Project.
- PLM: Product Lifecycle Management (PLM) tools generally refer to all solutions that are involved in the development of products, including bills of material management, requirements management and PPM. However, PLM is most closely associated with managing bills of materials, change orders and CAD files. Common PLM vendors include MatrixOne, Agile and SAP.
- CAD: Computer Aided Design (CAD) tools are generally used by engineers, architects and designers to draft or model products. Common CAD tools include AutoCAD, ProE, and Solidworks.
- Document management: Document management is used to track and store documents, including such functionality as versioning, routing and archiving. Common document management vendors include Documentum and Microsoft.

Survey

Below is the text from the CA survey on new product development trends:

CA is conducting a brief study on the changing world of new product development. We've all heard about outsourcing and globalization, but how real and important are these trends and challenges for your R&D organization? What technologies and processes are helping are the most successful?

Please fill out the survey below to share what changes you're seeing in your company and industry. The survey will only take 5 - 10 minutes of your time, and is completely confidential. Results of the survey will be announced in the upcoming weeks.

Please rate how these trends are currently affecting your R&D and new product development.

- Industry consolidation or layoffs



- Rise of global or outsourced R&D centers and design partners



- Corporate governance / competition driving reductions in R&D costs



- Increased customer involvement with development projects



Please rate the following statements regarding your development organization.

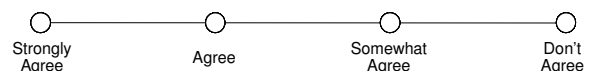
- It is easy for us to estimate, plan, and deliver development projects.



- It is easy for us to respond to new customer orders or changing deadlines.



- We never commit to aggressive or unrealistic development milestones.



- It is easy for us to find available resources for development projects.



- We have enough time to be innovative.



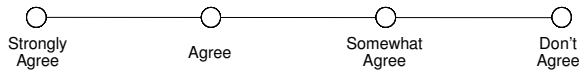
- We collaborate well with other departments, customers, and partners.



- My company is making sufficient investment in R&D resources.



- We consistently deliver new products on time.



- We are very innovative and successful with new products.



How would you characterize your company's efforts with outsourcing development? (Check only ONE)

- We do not believe in outsourcing development.
- We want to outsource development, but have not done it yet.
- We have done outsourced some R&D, but find it difficult to manage.
- We are very successful with our outsourcing relationship with R&D partners.

Which of these technology investments have you recently tried to resolve your product development challenges? (Check ALL that apply)

- Project, resource, and portfolio management
- ERP
- Document management
- CAD design management
- Product data/lifecycle management
- Other: _____

Which of these technology investments, if any, were the most effective in resolving your product development challenges? (Check only ONE)

- Project, resource, and portfolio management
- ERP
- Document management
- CAD design management
- Product data/lifecycle management
- Other: _____

Which of these process or organizational changes have you recently tried to resolve your product development challenges? (Check ALL that apply)

- Business process re-engineering
- Organizational structure changes
- Outsourcing
- Modified incentive plans
- Increased training

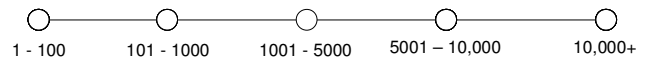
Which of these process or organizational changes, if any, were the most effective in resolving your product development challenges? (Check only ONE)

- Business process re-engineering
- Organizational structure changes
- Outsourcing
- Modified incentive plans
- Increased training

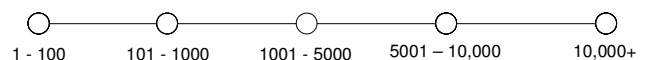
Which industry is your company in?

- Automotive, aerospace and transportation
- Industrial goods & manufacturing (chemicals, equipment, etc.)
- Financial services
- Software, Internet and computer services
- High-technology manufacturing (consumer electronics, telecommunications, etc.)
- Food and beverage
- Life sciences (pharmaceuticals, biotech, medical devices, etc.)
- Utilities and energy
- Other: _____

How many employees are in your company?



How many employees are involved in developing and launching new products?



About the Author

Miguel Tam is Director of Product Marketing for CA's Clarity Division, part of CA's Business Service Optimization (BSO) unit, which offers leading systems for portfolio, service, asset and change management.



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