

White Paper

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Executive Summary

Product innovation is the lifeblood of any organisation, driving competition, brand, customer relationships, profitability and cost. However in today's global economy, many organisations find that the challenges of meeting increasingly diverse market needs, shorter product lifecycles and increased global competition has exposed their lack of investment in product innovation capability. This can result in high research and development (R&D) costs, failure of new product launches, in life remedial action to fix cost and quality issues.

Our research has identified that Best in Class (BiC) organisations that focus on systematically improving their product innovation capability are up to four times more effective at meeting launch deadlines, achieving product objectives and meeting development budgets.



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WHY IS IMPROVED PRODUCT INNOVATION CAPABILITY REQUIRED?

Today there is a clear distinction in performance between organisations that invest in their product innovation capabilities and those that do not. Today's global economy enables businesses to rapidly eliminate competitive operational cost advantages through outsourcing and low cost country production. As a result organisations are increasingly competing and sustaining competitive advantage through innovation. Subsequently pressures to innovate have never been greater, which in turn generates greater pressure on product innovation capability.

Increasing reduction of product lifecycles

The need to compete via innovation has been heightened by increased regulation and specialisation of consumer needs. As such the velocity and volume of demand for new or customised products has significantly increased.

“Since the 1950s product lifecycles have shrunk by a factor of 4 as a result of the accelerating pace of innovation” (Von Braun – The Innovation War 1997).

The implication is that organisations have to innovate more (i.e. bring more products to market) in shorter timeframes than they were previously used to.

Greater market demands for rapid product introductions

There is a clear advantage on both revenue and profit goals if an organisation can get products to market faster than the competition. There is clear evidence that the first into market are 15% more successful than laggards.

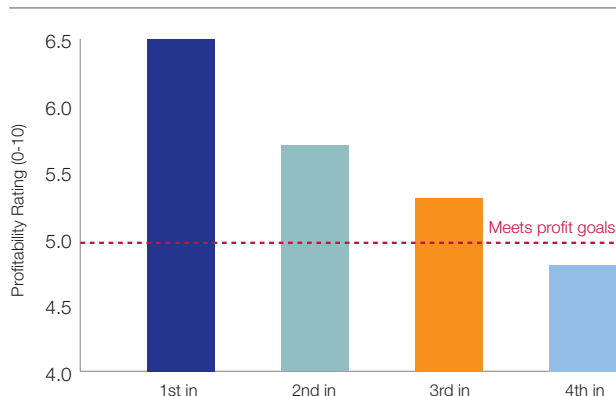
Limited product innovation capacity

Unlike supply chain which has a mature structure to accommodate operational volumes, product innovation is often viewed as a project based event. As such many businesses do not have the structures in place to cope with the volume and prioritisation of projects, resulting in a combination of missed launch deadlines or more likely, higher R&D. Volume pressures often result in resource or time constraints causing failures to deliver against all project objectives. These failures drive post-launch recovery work to meet margin, quality and cost expectations.

Common themes as a result of limited capacity:

- > Over engineering products and thus building in costs by not focusing sufficiently on customer requirements.
- > Product design changes still being applied post design cycle and following release to manufacturing causing considerable disruption, re-works, delays and ultimately costs.
- > Design for manufacture traded off against hitting launch dates resulting in manufacturing difficulties.
- > Failure to design in aftermarket service support efficiencies and opportunities resulting in missed revenue opportunities and costly in life maintenance and repair activity.

FIGURE 1: IMPACT OF SPEED ON PROJECT PROFITABILITY



Source: CEK study 2002

WHAT QUALIFIES PRODUCT INNOVATION BEST-IN-CLASS STATUS FROM THE SAMPLE STUDY?

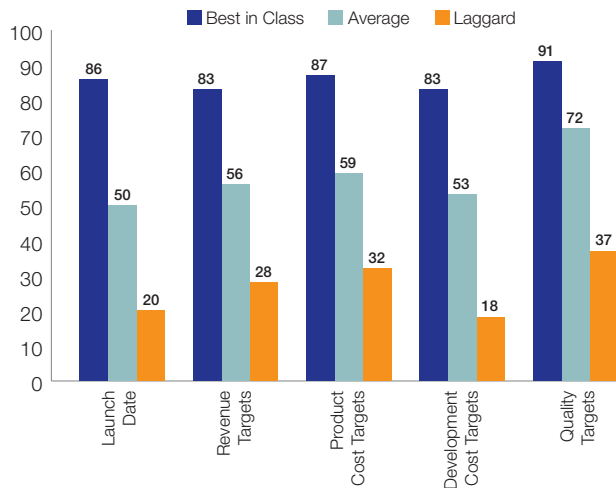
Atos Consulting sponsored the Aberdeen Group to survey 400 organisations worldwide to determine what organisations are doing to improve innovation productivity.

To ensure a balanced product innovation capability that focuses on time, product financial performance and R&D cost efficiency the survey measured the sample organisations against five key indicators:

- > Achieving launch date
- > Achieving revenue targets
- > Achieving product cost targets
- > Achieving development costs targets
- > Achieving product quality targets.

Figure 2 sets out the sample performances and clearly identifies the top 20% of organisations that form a BIC group.

FIGURE 2: PRODUCT INNOVATION PERFORMANCE



The survey identified that many organisations have been implementing lean manufacturing over the last five years (figure 3), but far fewer have implemented Lean Product Innovation programmes (figure 4). The majority of organisations that have been implementing Lean Product Innovation programmes have achieved BIC performance (figure 4).

FIGURE 3: LENGTH OF TIME – LEAN MANUFACTURING

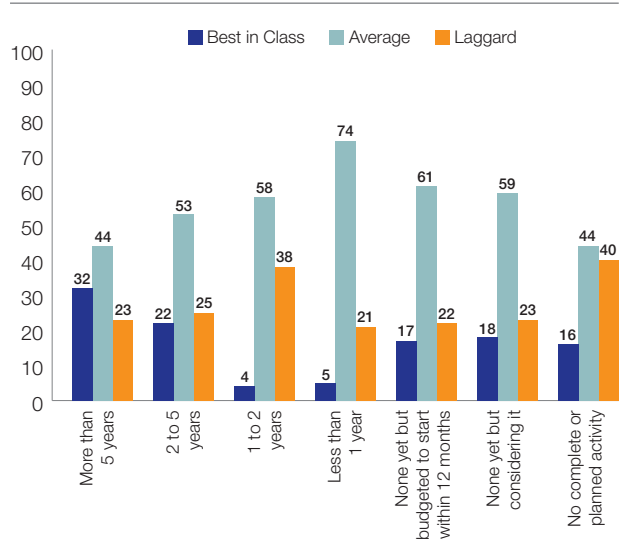
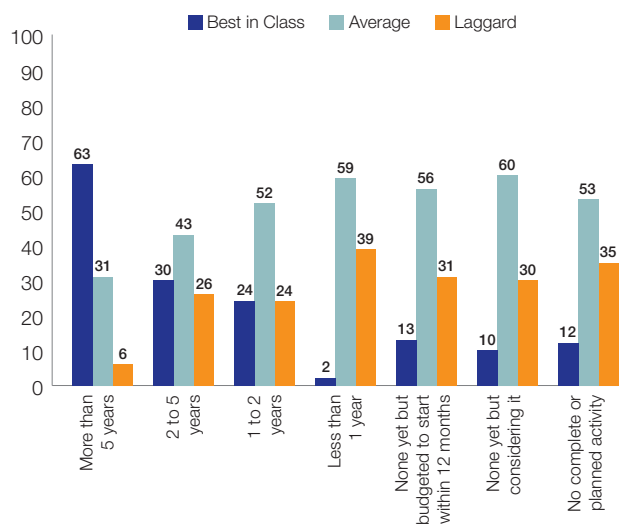


FIGURE 4: LENGTH OF TIME – LEAN PRODUCT DEVELOPMENT



The research identified the key pressures and actions that are shaping product innovation capability development. The capabilities focus on waste and time reduction, reduction of variability and improved information flow to enable concurrent working (Table 1 – PACE framework).

By implementing these capabilities the research identified that BIC organisations are:

- > 36% more likely to meet their target launch dates
- > 30% more likely to meet their development cost targets
- > 28% more likely to meet their product cost targets
- > 27% more likely to meet their revenue targets
- > 19% more likely to meet their quality targets.

TABLE 1: PACE FRAMEWORK

Pressures	Actions	Capabilities	Enablers
<ul style="list-style-type: none"> > Increasing reduction of product lifecycles > Market demand for rapid product introduction > Limited product development budgets 	<ul style="list-style-type: none"> > Improved product development processes > Reduced 'waste' in product development > Manufacturing involvement in product development > Cost reduction effort early in design 	<ul style="list-style-type: none"> > Product development using 'Design Sets' > Information flow aligned with process flow > Lean change / process improvement enabled at all organisation levels > Product development results measured with timely metrics > Value Stream Mapping > Standardised work methods > Concurrent design (integrated product / process design) 	<ul style="list-style-type: none"> > Advanced search technologies > Knowledge Based Engineering (KBE) > Digital Manufacturing (DM) / Manufacturing process planning > Specialty tools for Lean > Workflow / BPM > Product Portfolio Management (PPM) – including project management > Automated 2D/3D publishing > Product cost management > Value Stream Mapping > Product Data Management (PDM)

Source: Aberdeen Group, May 2007

WHAT IS LEAN PRODUCT INNOVATION?

Lean Product Innovation is made up of four elements, two of which are focused on product advantage and the remaining two focused on process advantage.

The concept of **product advantage** is focusing on those aspects of the product tasked with maximising and meeting revenue targets, while at the same time not losing sight of the importance of reducing and controlling product and development costs. The approach here will be two-fold, focused at targeting those aspects of the design and selecting those products which will yield the best revenues, while controlling the cost side of the equation.

Designing value

Consumer driven designs, together with clear profit performance objectives, governed by business rules that ruthlessly select and review the viability of product innovation projects throughout the design lifecycle. Capabilities required to achieve this are:

- > The use of project and portfolio management processes to define and review which product innovation initiatives should be supported to enable an organisation to maximise the return on investment of R&D spend.
- > Ensuring the right mix of innovation initiatives are in place between high innovation New Product Development (NPD) projects and Existing Product Development (EPD) projects, to deliver product customisation, cost reduction and quality improvement.
- > Ensuring the design is closely aligned with customer requirements eliminating additional component or maintenance costs by over-engineering, while avoiding cutting back on essential quality.

Designing the cost base

The focus is on ensuring the appropriate cost base is in place by designing competitive product cost at the design outset, adequately executing the product costing through rigorous procurement sourcing, and finally ensuring efficient manufacturing and supply chain operations.

To enable the design and delivery of the target cost base key tools are required:

- > The use of digital manufacturing and simulation technologies which identify design improvements and reduces the time and expense to market through a reduction in physical prototypes
- > The use of simulation also encourages innovation enabling engineers to evaluate multiple and potentially radically different scenarios, without committing to the expense of physical equipment
- > Engaging the supply base very early in the process to get maximum input into the design and enable ample time for supplier selection, prototyping, capacity implementation and ramp up quality management.

The other element going hand-in-hand with product advantage and facilitating Lean Product Innovation is **process advantage**. The concept of process advantage is also two-fold and is geared at reducing inefficiencies throughout the NPD and EPD processes, resulting in increased chances of meeting launch date targets as well as delivering against expected quality levels. The two components are:

Rapid and on time delivery

Front end loading of design activities to reduce variability, enhance process conformance and execution using technology to operationalise the processes. Identify appropriate processes to match the project type, where appropriate identify concurrent multi-disciplinary working to compact process time. The ultimate focus will be to target all the activities impacting the targeted launch date to eliminate bottlenecks and encourage concurrent multi-functional team working. Activities that will support these initiatives are:

- > The use of concurrent design (i.e. executing design activities for related components and manufacturing in parallel in order to shorten time-to-market).
- > Building process, knowledge management and technology architecture to support internal and external collaboration which will reduce time to market and costs, as well as optimise designs for downstream functions.
- > An organisation focus on all stages of the product lifecycle covering development, new product launch, growth, existing product development and deletion.

Low cost delivery

Focus is on the elimination of waste in the process, ensuring that the design, quality and cost base are right first time in order to reduce re-work post launch. This is driven by process efficiency and quality.

There are a number of actions that could assist to achieve this objective:

- > Value Stream Mapping to analyse the steps of a process in order to detect inefficiency, unnecessary actions and wasted effort

- > Multi-disciplinary working environments to eliminate knowledge, process and cultural barriers
- > Hard-nosed governance to manage the project portfolio to ensure projects are delivered and resource is applied effectively

To achieve both process and product advantage an organisation will need to develop a balanced portfolio of capabilities.

FIGURE 5: LEAN PRODUCT INNOVATION CAPABILITIES

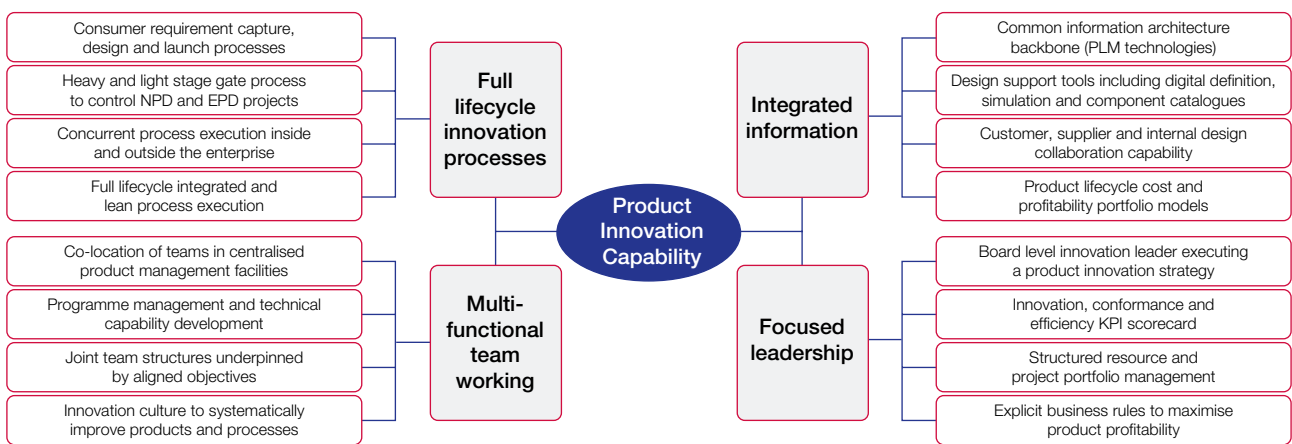


Figure 5 shows the four capabilities that provide the basis to exploit process and product advantage. However the challenges of building these capabilities are significant.

THE PATHWAY TO LEAN PRODUCT INNOVATION

Developing capability in the product innovation space is extremely complex. A number of challenges are:

- > Multiple functional roles playing constant and specific parts in NPD and EPD programmes
- > Business prioritisation around immediate operational issues at the expense of building long-term capability
- > Focus on immediate return on investment in a space where benefits realisation is often measured in years not months
- > Capability improvement initiatives delayed by a risk averse culture that does not want to miss milestones
- > Complex, concurrent and interdependent processes that pass through multiple functions and extend outside the enterprise often mask issues and opportunities.

To overcome these challenges organisations have to take a long-term development path undertaking a patchwork of initiatives that drive incremental improvements. This view is backed by the survey results that show a much higher proportion of BIC organisations undertaking Lean Product Innovation programmes for more than five years compared to lean manufacturing programmes.

Our experience of driving Lean Product Innovation programmes has enabled us to identify and create a pathway to lean productive innovation which is set out in Table 2. This pathway illustrates the initiatives organisations have used to build capability that moves them through each stage of maturity.

TABLE 2: LEAN PRODUCT INNOVATION CAPABILITY MATURITY PROFILE

Maturity	Control	Efficiency	Integration	Productivity
Full lifecycle innovation processes	<ul style="list-style-type: none"> Stage gate process R&D investment governance 	<ul style="list-style-type: none"> Complexity reduction via design and component re-use Standardised stage gate and measurement system End-to-end lean process initiatives Design for manufacture 	<ul style="list-style-type: none"> Multi-functional stage gate process Concurrent product development processes 	<ul style="list-style-type: none"> Multi-speed stage gate processes Lean design
Integrated information		<ul style="list-style-type: none"> Standard design and product management systems and formats 	<ul style="list-style-type: none"> Design information exchanges Integrated design information workflow 	
Multi-functional team working	<ul style="list-style-type: none"> Fixing fragmented processes 	<ul style="list-style-type: none"> Centralised design centres Process outsourcing 	<ul style="list-style-type: none"> Process based organisation Supplier management processes Process outsourcing to suppliers 	<ul style="list-style-type: none"> Competitive/supplier product development alliances Multi-functional product development centres Integrated value chain programme management
Focused leadership	<ul style="list-style-type: none"> Design and test efficiency goals 	<ul style="list-style-type: none"> R&D project portfolio management Resource allocation and control 	<ul style="list-style-type: none"> Activity, resource and cost modelling 	<ul style="list-style-type: none"> Enterprise project portfolio management

Conclusion

It is clear that with the global challenges now facing many organisations the need to improve product innovation is an important source of competitive advantage. Our sponsored research identified that BiC organisations had a distinct product innovation advantage and have invested in long-term lean improvement programmes to build product innovation capability.

Our view is that Lean Product Innovation must focus on driving the five Indicators: Achieving launch date, Revenue targets, Product cost targets, Development costs targets and Product quality targets. These balance both product and process performance. To achieve BiC performance organisations must build capability across four areas: Full lifecycle innovation process, Integrated information, Multi-functional team working and Focused leadership. The challenges to do this are significant so organisations must invest in long-term improvement programmes that systematically move organisations along the capability maturity curve.

Building Lean Product Innovation is a long-term commitment; however our research identifies a clear benefit to organisations that have made the investment.

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