

## Lean and agile thinking: appropriate IT for successful manufacturing businesses

### Introduction

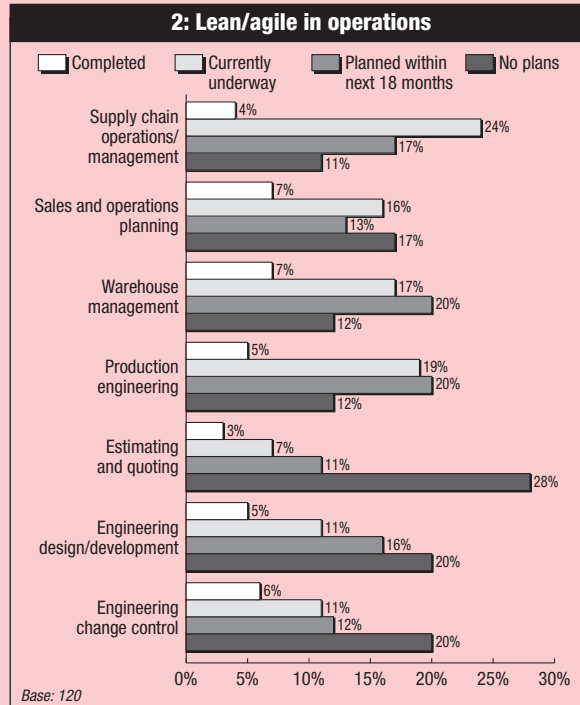
Lean thinking, as opposed to lean manufacturing – meaning the application of lean concepts, methodologies and supporting tools, techniques and systems to whole businesses, not just to the factory – continues to grow in popularity. As manufacturers experience worsening competitive pressures from rivals in the UK as well as those around the world, management teams seem to be realising that, while ‘going lean’ is neither trivial nor short and sharp, it’s the only way they’re going to survive and hopefully revive their fortunes.

Evidence is growing that this key message is increasingly being received, understood and acted upon – and far beyond industries like the automotive sector that have traditionally benefited from earlier, so-called ‘pure’ lean. Newer, broader church, ‘impure’ lean interpretation (which takes into account most manufacturers’ inevitable requirements for greater production and business flexibility to respond to changing product mixes, engineering developments and customer demand) is the reason.

That and the panoply of appropriate modern IT aimed at automating business processes, seamlessly connecting departments, functions and workflows, and effectively redefining ‘waste’, are together enabling lean to become agile and applicable business-wide. And that in turn is enabling adopters to raise their game and to profit from their earlier lean manufacturing achievements.

All of which is very encouraging. But going lean is not just rewarding: it also means hard work over a long period, requiring considerable effort and time from the senior management team up-front, and typically businesses’ best people across all the departments it touches thereafter. In terms of resources required, there is a marked similarity to the implications of a full ERP implementation.

It may well also require some investment – including, but not exclusively, in good, modern IT, augmenting or renewing existing systems to enable and sustain developing lean improvements and efficiencies. While there is no truth in the assertion that a wholesale ‘rip and replace’ job is needed, it is highly likely that manufacturers will find IT changes and



additions on the lean business agenda.

Most projects may well be self-funding with a fairly rapid ROI (return on investment) against hard and some somewhat softer KPIs. But, importantly, these increasingly need to be measured and judged across departmental and even company boundaries, along the lines of sales and operations planning (S&OP), not only internally to the main department(s) concerned.

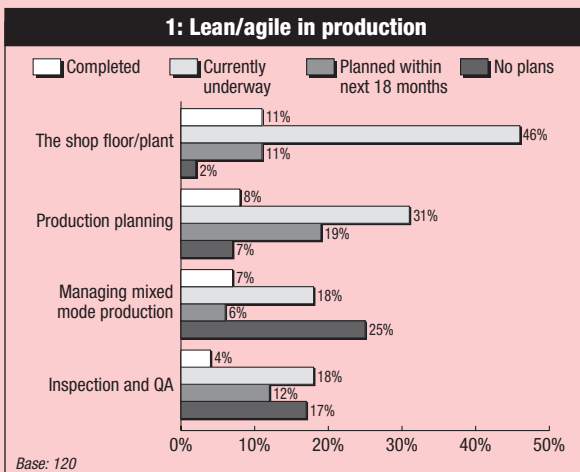
No manufacturing company already under pressure can afford to get this kind of major transition even slightly wrong. The ‘right first time’ maxim is essential with lean/agile business projects – arguably more than anywhere.

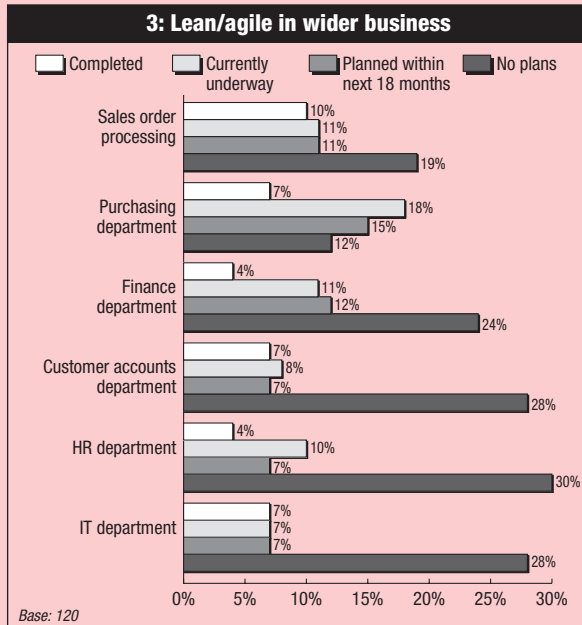
So this report examines what’s working, how well, where and under what circumstances. It looks at current preferred lean initiatives across manufacturing industry and across different departments – the choices, uptake, barriers and outcomes – with statistics derived from a comprehensive online survey conducted for Manufacturing Computer Solutions. Importantly, it provides detailed analysis of relevant IT uptake, appropriate application and potential benefits.

### Survey stats and methodology

This study reveals how many companies are thinking along lean lines, which areas of their businesses are receiving most focus, the benefits they have derived – and what it has meant to their manufacturing and business processes, and particularly the investment in IT that underpins them.

Manufacturing Computer Solutions surveyed 120 managing directors, operations directors and managers (and similar) in UK manufacturing organisations – those already well on their lean business journeys, others early on the lean path and others again that have as yet not progressed with





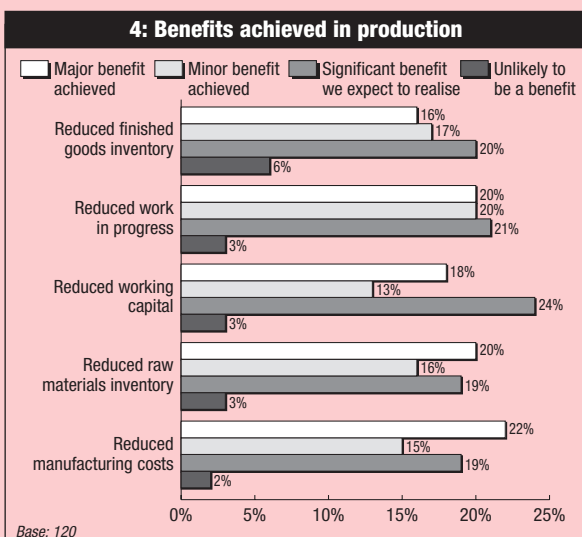
lean. The objective was to build the fullest, most detailed and statistically significant picture possible.

The vast majority of companies surveyed (72%) run mostly make-to-order operations, although batch processes also feature at 42%, along with make-to-stock at 47%, engineer-to-order at 29% and configure-to-order at 18%.

Survey respondents were from across discrete, process and general industry sectors, covering virtually all manufacturing process types. Automotive suppliers, aerospace and defence, electrical and electronic, and general manufacturing formed the majority. But others represented include food and drink, chemicals, pharmaceuticals, pulp and paper, textiles and metals processing.

Most sites surveyed were medium-sized, with 47% employing 1—99, 24% employing 100—199 and 21% employing 200—499. Larger companies of 500+ employees made up 8% of the total. Most respondents were either responsible for the entire site (managing director, CEO or general manager at 21%) or for production operations (29%), while a minority of heads of IT (7%) and heads of design and R&D (8%) also took part.

More than half (52%) of our sample are currently engaged in lean projects, 9% are well advanced with plans for projects to run in the next 12 to 18 months and 8% believe they have completed at least their initial phases of lean transformation. 31%, however, have not embarked on lean and have no immediate plans to do so. Of those, reasons



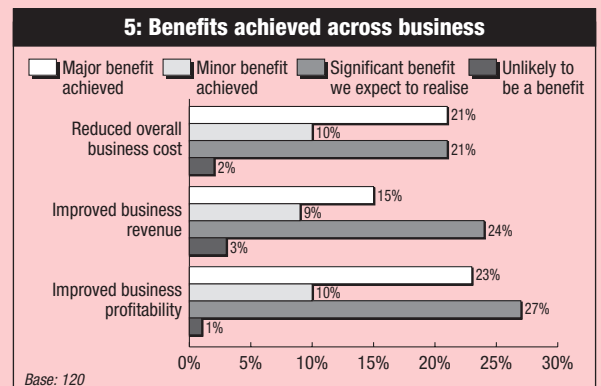
given for lean aversion range from a stunning one fifth claiming not to know what 'lean' is, while a few (3%) asserted that the term has become almost meaningless, or that they believe lean to be too inflexible, or simply that it was not supported by the management team.

### Preferred lean business projects

Although lean has been around for decades and lean business thinking for several years, the factory remains the primary focus for lean attention. Of those treading the lean path, by far the majority are running lean projects on the shop or plant floor — 11% say they have completed this phase, 46% are in process now and 11% have it planned for implementation within the next 18 months. Intimately linked lean production planning is complete at 8% of sites, underway at 31% and planned at a further 19% (figure 1).

Interestingly, a sizeable minority are also using lean techniques and technologies to improve management of their mixed-mode production where agile manufacturing is a requirement: 7% say they have done the work, while at 18% it is currently underway and a further 6% have plans here. Indeed only 3% say they have no plans in this direction.

However, lean factory developments are also starting to spread beyond production itself: inspection and QA departments, for example, while somewhat down our sample's priority list, have had lean applied at 4%; 18% are

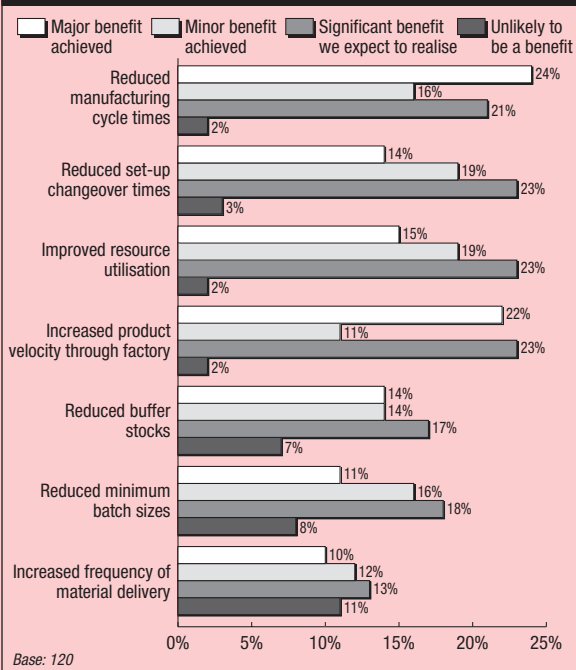


working on them now; and 12% have plans for lean adoption there. And there is evidence that lean is also now increasingly being used to improve the effectiveness of production and demand management, with projects fairly well advanced in sales and operations planning: 7% have done the work here; at 16% it is underway; and 13% say they are planning it.

Moving further away from production, supply chain management is now creeping up the lean business agenda: although only 4% have completed their work here, 24% say they have it underway now and 17% are planning lean supply chain implementations. Also, the picture is similar with lean thinking harnessed to improve the effectiveness of warehouse management: again the effort appears to be mainly current and future, but 7% are there, 17% have lean warehouse projects underway and 20% are planning it for implementation in the next 18 months (figure 2).

Production engineering appears to be viewed similarly: 5% have spread lean into this activity, at 19% it's underway now and a further 20% have concrete plans to implement lean here in the next 12—18 months. However, rather fewer are thinking of lean to improve their estimating and quoting processes, despite a considerable number of respondents reporting a serious emphasis on configure- and engineer-to-order operations. Just 3% have done it, 7% have it underway and 11% have plans. Our findings suggest that since this work is specialised and crosses traditional boundaries of sales and engineering, progress in terms of convincing people on the ground of the benefits of lean/agile methodologies and systems may well be slower.

## 6: Detailed production benefits from lean/agile initiatives



Sadly, but not surprisingly, only slightly more have lean in their sights for the modern equivalent of the drawing office. Just 5% claim they have injected lean concepts into engineering design and product development, 11% say it's a current activity and 16% say it's at the planning stage. Meanwhile, lean projects to improve the processes around engineering change control are in much the same boat, with 6% done, 11% underway and 12% planned. There are investment issues here – not just in training individuals for cross-functional collaboration, but in the supporting engineering data management IT – that will have to be resolved if companies are to get competitive advantage.

Looking at the wider business picture, sales departments taking on lean methodologies and systems remain few but rising: 10% believe they have done the work; 11% say it's a current activity; and a further 11% are planning lean projects for sales. Purchasing departments are similar at 7% done, 18% underway and 15% planning lean implementations. Then, somewhat surprisingly, finance departments, often regarded as one of the last bastions of tradition, are seeing lean activity not far behind at 4% done, 11% underway and 12% with lean plans (figure 3).

But customer and account management departments are at the bottom of the lean heap at 7% done, just 8% with projects underway and 7% planning it. HR departments are in much the same position at 4% done, 10% underway and 7% with plans. Interestingly, IT departments too are well down the lean transformation list at 7% done, just 7% with lean projects underway and 7% planning a project.

Clearly, there is room for considerable improvement, but the overall picture is encouraging and shows lean business projects as well beyond the education and early adopter phases, and now into prioritised implementation. As hard benefits relevant to individual departments and whole businesses are realised, documented and published, our evidence suggests that this will continue to gather pace.

### Key recorded benefits from lean projects

An examination of our respondents' views of key benefits achieved as a direct result of their lean projects reveals an unsurprisingly strong focus on production and operational measures. It is likely that other more general and front office orientated KPIs will climb up the recorded benefits listings only as implementations spread deeper and wider across other business domains (figure 4).

Nevertheless, our sample's ratings of their achievements in and around production provide real world confirmation of the lean rhetoric – and proof that production improvements lead very directly to considerable overall business improvements as cited by our respondents. For example, 36% of our sample say lean has or will have a major impact on reducing finished goods inventory, with a further 17% billing this as an improvement, albeit minor. Similarly, 41% claim significantly reduced WIP (work in progress) now or expected, and another 20% say they have seen minor improvements.

In line with the latter, 42% say they have or will soon seriously reduce working capital requirements while 13% see some improvement here so far. And similarly, 39% believe they have or will cut their raw materials inventories, with a further 16% seeing some advantage. Taking another view of business cost, 41% say they have or will significantly reduce manufacturing costs (another 15% see minor impact), and 42% claim current or future major overall business cost reductions, with a further 10% seeing a minor contribution.

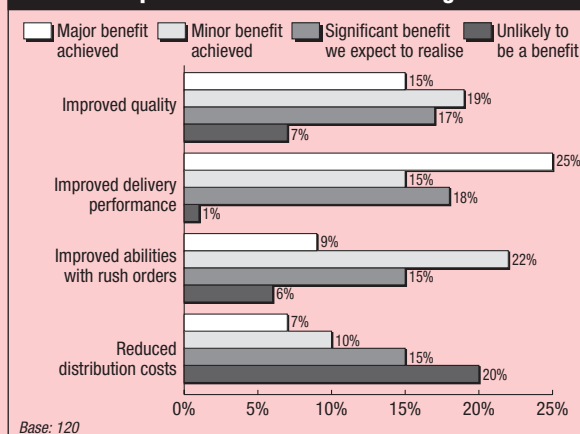
Perhaps the most important statistics are those relating to companies' trading performance. A very significant 39% of our manufacturers say they have or will soon see major improvements to business revenue (a further 24% see a minor, but still positive contribution here) as a result of their lean implementations. Even more convincing, exactly half of our sample state that their lean projects have or will substantially improve business profitability, with another 10% claiming gains – albeit less impressive – from lean (figure 5).

These figures are outstanding: given individuals' different perspectives of what constitutes 'major' versus 'minor', lean is plainly making, at the very least, a worthwhile difference. And for the record, the figures for those stating no financial improvement from lean range from just 2% to 7% throughout this section – the rest providing no answer.

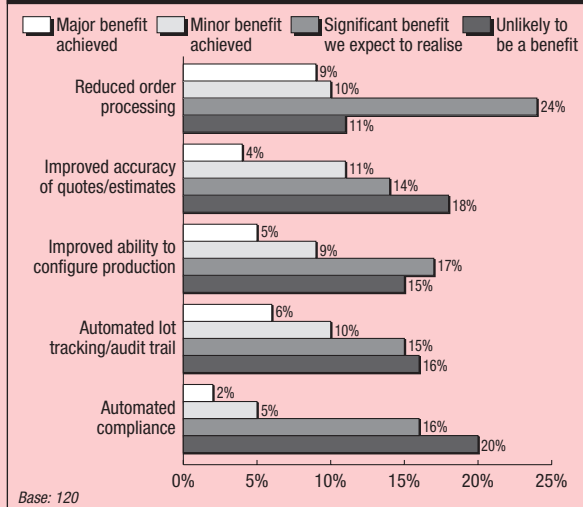
Returning to production itself, some of the detail is worth closer observation. Manufacturing cycle times, for example, have been or are being seriously reduced at fully 45% of our respondents' sites, and slightly reduced at a further 16% through their lean projects. And the figures are similar for set-up and changeover time improvements, with 37% claiming major reductions and 19% minor cuts. Looking then at resource utilisation, 38% say they're achieving major gains, while a further 19% indicate minor improvements. The figures for increased product velocity through manufacturers' plants are equally convincing: 45% claim major improvements and 11% minor. A tiny minority report no change (figure 6).

Moving that onto related KPIs, lean has also directly contributed to major quality improvements at 32% of our sample as well as minor improvements at a further 19%. Then delivery performance has been or will be seriously enhanced, according to 43% of our respondents, with a further 15% seeing minor improvement. And, very

## 7: Detailed operational benefits from lean/agile initiatives



### 8: Disappointing areas for lean/agile initiatives so far



Interestingly, 24% can also see major improvements in their ability to handle rush orders, while 22% note at least some improvement here (figure 7).

On the other hand, lean implementations have not, as yet, scored so well in improving the following areas: order processing, estimating and quoting accuracy, product configuration, lot tracking, compliance and distribution. Given the fact that our respondents also indicate that these departments have not been on the receiving end of anything like the level of lean attention enjoyed by the main production disciplines, we should not be too surprised. Neither should we assume that lean won't deliver when its methodologies are brought to bear and appropriate technology investments made (figure 8).

Nevertheless, the stats still show improvement, so for the sake of completeness we include them here. 33% of our respondents say they have or will achieve major improvements in terms of order processing; 10% say the improvement has been minor; and 11% that there has been no improvement at all. Quoting and estimating has been or is expected to be greatly improved at 18% of sites, slightly improved at 11%, but not improved at all 18% of our

sample. And the figures for improved ability to configure products to order are similar: 23% claim major improvements now or to come, 9% expect minor improvements and 15% none at all.

Then lean projects have significantly improved lot tracking and automated audit trail functionality at only 6% of respondents' sites; they are expected to do so at a further 15%; the improvement is only slight at 10%; and 16% say that it's made no difference at all. And for automated compliance the figures are less encouraging – with just 2% saying they have achieved significant improvements, 16% expecting to do so, 5% seeing minor improvement, but 20% stating that lean has made no difference here.

### External help choices

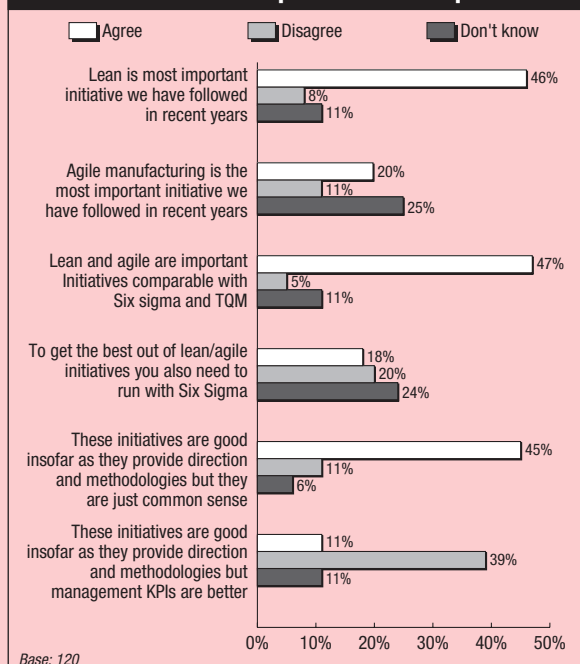
How are our manufacturers achieving their lean manufacturing and business improvements? By far the majority either used small specialist lean/agile consultancies (24%) and/or did all their work internally (23%). Just 3% used Big Four or similar management consultancy practices.

Most interesting, the DTI's independent Manufacturing Advisory Service (MAS) figures highly, with 18% of respondents saying they used its facilities. That figure can only grow as manufacturers currently looking seriously at lean implementations increasingly understand the value of the mostly free MAS consultancy offering, particularly in terms of analysing and steering production-related lean improvements.

Then we come to the rest, with roughly one tenth of our sample saying they used one or some of general manufacturing consultancies (7%), best practice groups and institutions like the Association of Manufacturing Excellence (AME at 8%), their main IT vendor (most likely to be the ERP provider, at 7%) or their system integrator (5%).

Interestingly, 8% said they harnessed the expertise offered by supplier development programmes run by their main customers. Lean advocates clearly state that for lean to work well, the supply chain needs to be intimately involved and operating under lean principles such that materials, components, subassemblies and so on flow, without waste, through the various organisations in the value chain. This sizeable minority indicates that the message is being heeded and that larger organisations with a significant dependence on their suppliers are offering assistance (or possibly carrot and stick persuasion) on a win-win basis.

### 9: Perceived importance of lean/agile initiatives against other business improvement techniques

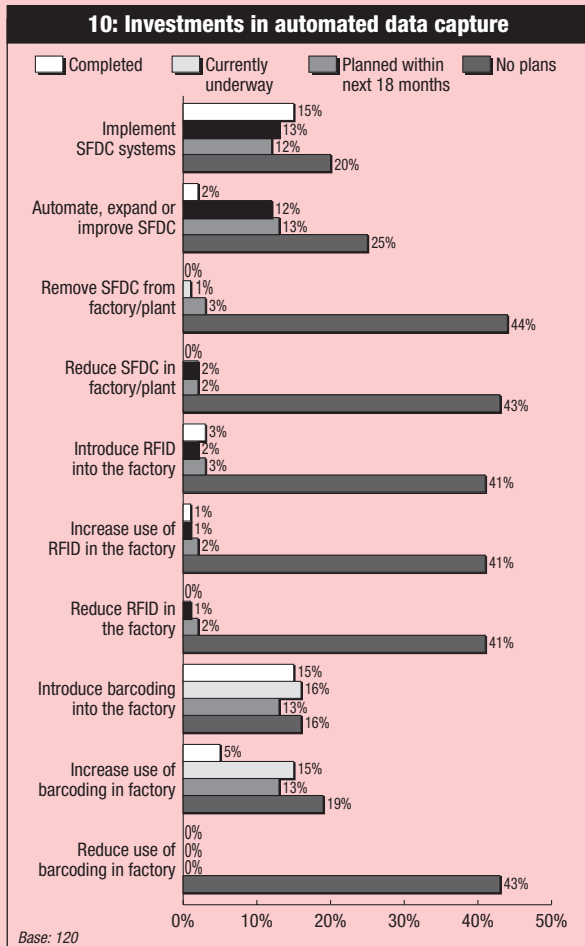


### Personnel trained in lean/agile

Beyond external help, it is important to understand how manufacturers are making successes of their lean transitions (given the scale of cultural change required) not just on the shop floor, but throughout the business – and particularly with middle management. Management approaches like the old school 'command and control' typically fail to enable sustained lean improvement since they tend to stifle 'bottom up' thinking and thus a very large proportion of the potential for continuous improvement.

So we asked our respondents about those they had specifically trained in aspects of lean thinking to drive their projects. Nearly half cited their managers in areas of the business directly affected by their lean projects (45%) and more than one third said they had gone beyond external training and created or hired internal lean champions (37%) to drive ongoing improvements. Then again almost one in two (42%) highlighted staff in directly affected areas. These figures together indicate the serious attention lean was given to get the manufacturing business excellence everyone craves.

But note that nearly one third (28%) also stated that their senior executives, and indeed some or all of their boards of directors, had also received in-depth training in lean thinking. Such a sizeable minority appears to confirm the scale of expectations business leaders increasingly have of their lean projects. It is also indicative of the seriousness with which many manufacturers' senior managements view lean.



tools and supporting IT, although maturing in parallel with lean thinking, just didn't enjoy the mindshare enlisted by the huge global automotive machine that spawned lean.

That is borne out by our sample, nearly half of which (46%) said they agreed with the statement "Lean is the most important initiative we have followed in recent years." Only 8% said they disagreed. And the scale of importance attached to lean thinking may well be even greater: relatively poorly defined 'agile manufacturing', largely viewed as an extension of lean thinking for manufacturers dealing with high variety and variability, was seen as "the most important initiative we have followed" by 20% of our sample, although 11% disagreed (figure 9).

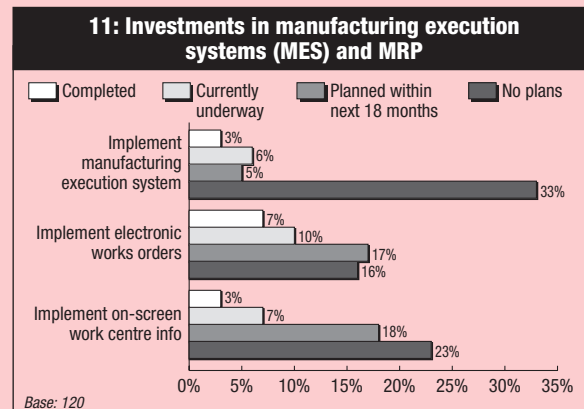
That is probably no more than an indication of the definition issue around 'lean' and 'agile' – although it has to be said that UK manufacturers' level headed and pragmatic views of formal initiatives in general is an important factor here. Indeed, when we asked our respondents if they felt lean and agile were important initiatives comparable with Six Sigma, one in two (47%) agreed and only 5% disagreed. And nearly half (45%) said they agreed with the statement, "These initiatives are good insofar as they provide direction and methodologies, but they're just common sense."

There is one aspect, however, upon which our senior respondents could not agree. When we asked them if they thought that to get the best out of lean and/or agile manufacturing projects, it was necessary to run with Six Sigma initiatives as well, the same number agreed as disagreed (one fifth each). But one quarter answered the question as "don't know" – much higher than for most and suggesting they don't know simply because they haven't done it. The mere fact that they have also achieved mostly enviable improvements probably answers the question most eloquently.

Just as important, for those convinced of the value of management KPIs as the most important driver – not any one of the numerous manufacturing or indeed management initiatives – our sample's view was a near four to one disagreement (11% for and 39% against). Of course, the majority view is not necessarily right and, equally, there are very strong arguments in favour of management KPIs as long as they are well constructed and well articulated in terms that are relevant throughout the business. But the plain fact is that to achieve the latter, very many organisations find themselves turning to the very methods, techniques, tools and systems that modern lean thinking recommends.

### Shop floor lean IT investments

Looking in more detail at the implications for systems in production operations as a result of manufacturers' lean journeys reveals an encouraging picture of modern lean maturity, understanding and pragmatism. The biggest swing is a clear move to the more sophisticated end of SFDC (shop floor data collection), with 27% already implemented or currently rolling it out, and an additional 12% planning to do



Times are hard, and directors clearly feel that a hands-on approach is called for, and will be instrumental in building success for the future of their companies.

Importantly, it also suggests that more senior management now understand the criticality of lean's core precepts – that sustainable and best lean transitions have to start from strategic, business-wide value stream mapping, including full development of a future vision that clearly articulates where the business wants to be and believes it can be. Incidentally, it also correlates well with the numbers indicating major improvements in the key areas we questioned.

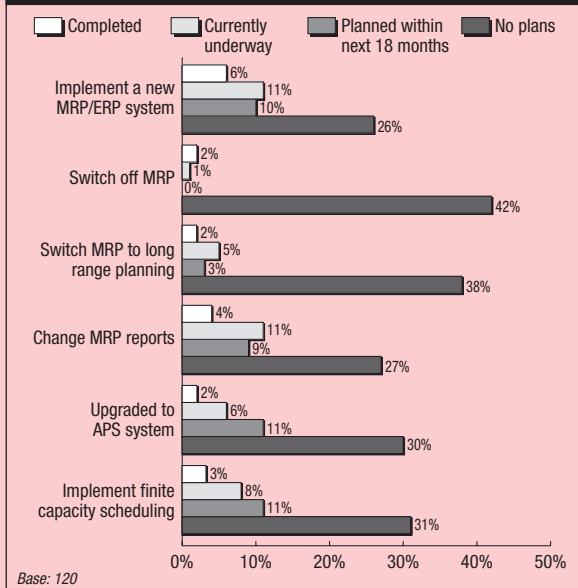
And that point is borne out by nearly one quarter (22%) of our respondents stating that managers in other parts of their businesses not directly affected by current lean projects also received lean training – and the fact that 16% took that all the way to include operators and staff in other parts of the business.

### The importance of lean versus other manufacturing business initiatives

It is interesting to speculate what could have been achieved with other manufacturing/business improvement initiatives had the level of determination and investment given to lean projects been considered for them too. Much of the success of lean hails from its advocates' presentation of lean thinking as precisely that – an alternative way of viewing the business of manufacturing management and execution that is necessarily all encompassing.

Lean is not entirely alone in that approach: converts to Theory of Constraints similarly pushed, and still push, for the whole business approach. But their near evangelical passion combined with the apparent contradiction of accepted manufacturing wisdom in the early days proved too rich for most. It's also fair to say that the methodologies, techniques,

### 12: Investments in planning and scheduling systems

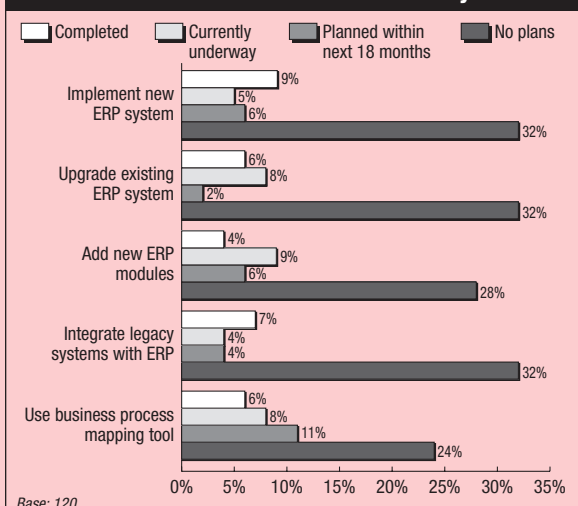


so soon. A further 14% say they are automating or improving their SFDC and 13% have plans to do so this year or early next. Contrary to older 'pure' lean advocates' exhortations, virtually no-one is removing or reducing SFDC 0%/1%/3% and 0%/2%/2% respectively (figure 10).

Then while uptake of RFID remains minimal, many more manufacturers are adding barcoding systems for automatic tracking and labelling: 30% of our sample say they already have or are now implementing barcode systems in their factories, while 13% say they intend to do so. And a further 19% say they have already or are currently extending their use internally, while 13% say they have plans for this – indicating that focusing attention on IT and automation in the factory is seen as paying dividends in terms of enabling and sustaining lean manufacturing business improvements across the broad swathe of manufacturers. No-one says they are reducing barcode system adoption.

Apart from these, MES (manufacturing execution system) investments appear to score low at 8% done or implementing systems now and 5% with MES plans. This may well be due to poor recognition of the term: few see their lean developments as MES projects – they're production management systems or more specific solutions to handle factory co-ordination issues. For example, asking about projects to implement electronic shop floor systems for works order generation and management, or for that matter the provision of cell level information on-screen, reveals

### 13: Investments in ERP and associated systems



significant investment. For the former, the figures are 17% done or doing, and 18% about to. For the latter, they are 10% done or doing and 18% with plans (figure 11).

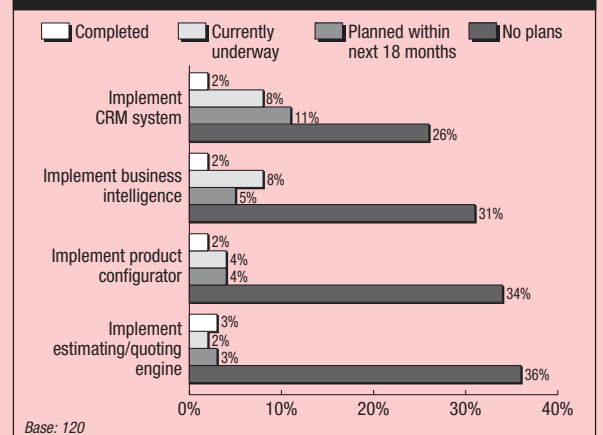
It is instructive to note that some of our respondents have also felt the need to implement changes with respect to their ERP/MRP systems in order to improve and cement in the lean/agile operations they need on the shop floor. 7%, for example, have implemented a new ERP/MRP system as part of their lean projects, with a further 11% doing so now and 10% planning to do so. On the face of it, that is high.

Note also that very few now believe the old adage that switching off the MRP component of ERP is an important way to achieve lean: only 1% said they had switched their MRP off, 1% are currently doing so and none believe they will do this. But a few more believe that moving conventional MRP to long-range planning is sensible: 2% have done that; 5% are doing it and 3% say they will do so (figure 12).

Getting clarity on precisely what is happening here is not easy: what makes sense around these fundamental systems depends so much on individual companies' operating methods, their existing systems, market demands and the like, as well as the beliefs of the management team concerned. So it's enlightening to observe that 4% say the primary change they have made is "to more useful MRP reports" – with a further 11% saying that's what they're doing now, and another 9% with plans to go that route.

Further, APS (advanced planning and scheduling)

### 14: Investments in ERP add-ons



systems, hitherto seen by many as anathema to lean projects, are seen by a significant minority of our sample as enablers: 3% say they have upgraded to an APS system, 6% have APS implementations currently underway and a further 11% plan one in the next 18 months. Then again, 3% have invested in what they term FCS (finite capacity scheduling) systems instead, with another 7% doing so now and 11% with plans for FCS. Given the subtle differences today between APS and FCS (in terms of users' understanding and their practical functionality), it seems the view that smarter, IT-assisted shop floor planning and scheduling leads to better optimised lean operations is gaining ground, at least where high variety and variability are concerned.

Meanwhile, factory simulation software tools are also seeing modest growth, with a surprisingly high 9% already or currently equipping themselves and 7% with plans to do so. As for the picture in terms of additional automation and graphical plant operator assistance, SCADA/HMI (supervisory control and data acquisition / human machine interface) solutions, for example, have been installed on 5% of plants, with 9% following suit now and another 4% planning to do so. Additional PLCs have been bought and implemented at 7% of sites, with 8% doing the work now and another 6% planning it. And 3% say they have installed other automation systems, 13% that they're doing so now and 8% that they will within the next 18 months.

## Lean across enterprise systems

Then, considering overall business management, including planning, scheduling, reporting and the links into customer management, estimating and quoting and so on, the impact on IT is growing. Looking at ERP systems in particular, 20% of our respondents have already implemented new software or are currently rolling it out or planning to do so (9, 5 and 6% respectively). Meanwhile 15% are upgrading their existing ERP (6, 8 and 1% respectively), while a similar quantity are adding new modules for what they consider necessary additional functionality (4, 9 and 6% respectively).

Clearly, lean users are increasingly upgrading or even rolling out new ERP systems to achieve what they find is essential lean cross-business functionality not supported on their existing enterprise IT foundation. And it's also worth noting that a fair wedge are also involved with system integration projects to support the necessary improvements. 15% of our manufacturing directors and managers are focusing some of their IT budget on integrating their legacy systems, with a further 4% planning to do so (figure 13).

What's more, a surprisingly high number have graphical business process mapping or modelling tools in their sights: 5% say they have rolled such a system out; 8% have an implementation underway; and 11% are planning for a system within the next 18 months.

Beyond that, 10% have already or are currently working on CRM (customer relationship management) add-ons, with a further 11% having plans to do so in the next 18 months; and 10% have already or are now implementing business intelligence systems, while an additional 5% say they're going to do so soon. Beyond these, just 6% either already have or currently are implementing product configurator add-ons, with a further 4% claiming near-term plans. The figures for estimating and quoting engines are much the same, with 6% done or doing, and 3% planning a purchase (figure 14).

Interestingly, most of the activity for all of these bolt-ons is either current or planned for this year or early next. Our respondents suggest that, among manufacturers on the lean journey at least, these kinds of IT add-ons are coming from a fairly low base. It seems that their value has only been realised relatively recently, probably as more basic shop floor lean continuous improvement initiatives started to plateau.

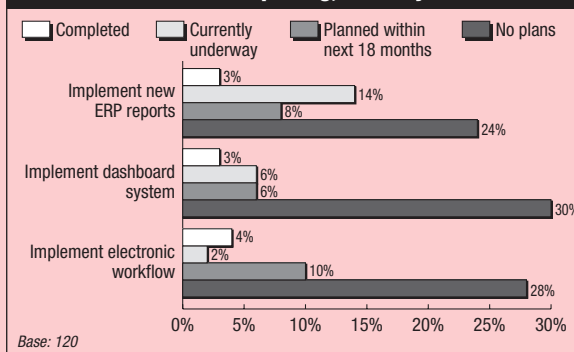
Looking at the picture for other management information improvements, some manufacturers are altering the ERP reports they use to run business and production planning (35% done, 14% working on it now, and 8% with plans to do so); rather less are looking at management dashboard systems (3% done, 6% doing and 6% with plans); and electronic workflow improvements seem not to be high on the agenda either (at 4% done, 3% doing and 10% with plans). See figure 15.

Finally on the enterprise systems resourcing and management front, we asked our respondents what, if anything, they were doing about outsourcing – and the replies seem to follow the rest of manufacturing business management, lean or not. Just 7% have outsourced their IT infrastructure and network management, for example, with a further 5% doing so now and just 1% planning to. The figures for outsourcing some or all IT development work are much the same (7%, 4% and 2%); break/fix contracts are no higher (6%, 3% and 1%) and outsourcing application management ditto (3%, 2% and 0%).

## Lean in the supply chain

Moving on to the figures specifically for supply chain-orientated ERP extensions, lean followers are increasing their investment in overall supply chain management add-ons – with 16% done or running projects now, while 12% are planning them. The biggest focus is on web-based systems for supply chain communications. For web EDI and similar projects, for example, 15% have done or are implementing systems now (approximately the same numbers for each), and

**15: Investments in ERP reporting, visibility and automation**



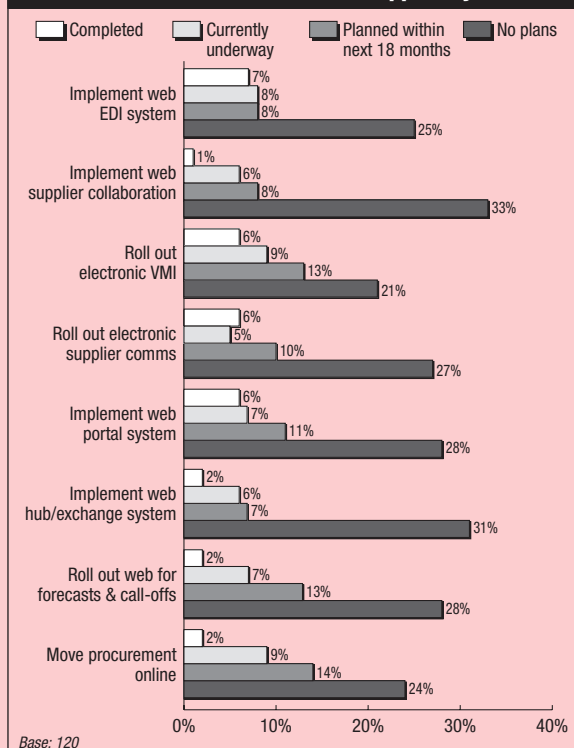
8% have them in their sights. Add in those that say they are favouring web-based supply chain collaboration systems, or electronic supply chain communication systems (at 6% done, 10% doing and then 18% with plans), and this kind of development is looking popular (figure 16).

And the figures are much the same for web portal developments, connecting to the increasing numbers of web hubs and exchanges and generally getting web connected for supplier forecasts, call-offs and the like. Looking at the detail, web working for supplier forecasts and call-offs shows 2% done, 7% doing and 13% planning to; while for connecting to web portals the figures are 6% done, 7% doing and 11% planning to. For those that describe themselves as connecting to web hubs and exchanges they are 2% done, 5% doing and 7% with plans.

Interestingly, the figures for moving more procurement online are in a similar range: 2% done, 9% doing and 14% planning to. But when it comes to the full blown supply chain event management (SCEM) software, implementation figures are much lower at 2% done, only 1% doing and 7% planning SCEM systems. Either there's a lack of understanding about precisely what SCEM is and its scope, or (less likely) it's the automation and alerting end of SCEM that isn't yet seen as so important to manufacturers wanting lean/agile supply chains.

Incidentally, on automated electronic alert systems, 4%

**16: Investments in web-based supplier systems**



have them, 7% are implementing a system now and another 7% have plans to do so. And as for automated electronic workflow systems the figures are almost identical at 3% done, 7% doing and another 7% planning to do so.

It's also worth noting, however, that there is little difference between the figures for going for APS for improved lean production floor optimisation and management versus extending that to APS for optimising supply chain operations. The figures for the latter show 2% have done this, 9% are doing it now and a further 7% have plans to do so as part of their extended lean/agile thinking (figure 17).

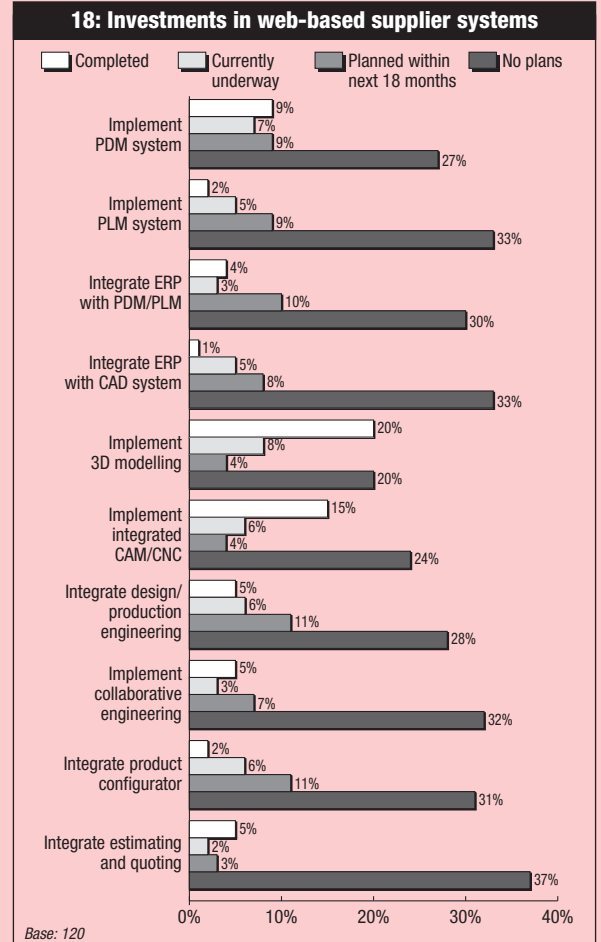
One overall observation on technology adoption for lean supply chain improvements: virtually throughout this part of our study, more of our respondents again told us that they are currently doing this stuff or have plans to do so, as opposed to having completed implementations. That concurs entirely with our findings earlier in this study, which indicate that most are at the stage of currently rolling out lean supply chain systems or planning them – the implication being that only when it comes to leaning-out their processes beyond the factory does enabling IT of this nature become a prerequisite.

### Lean in engineering design and development

Finally, however, it is important to understand that lean/agile work is not just proceeding in materials-related operations. Our survey reveals that design and change management are getting lean/agile support through IT as well. Product data management (PDM) systems, for example, that enable slicker working not only within the design department but out into production and front office business departments, are already in at 9% of our respondents' companies, while 7% are implementing systems and modules now, and 9% have plans to do so in the next 12–18 months (figure 18).

The figures for more comprehensive product lifecycle management (PLM) implementations are slightly less encouraging at a disappointing 2% done, 5% working on installations now and 9% with plans to do so within the next 18 months. But again it's worth remembering that PLM is a more recent term and that collaborative cross-department, cross-company, cross-time product data-centric operations involve significant departmental and individual role changes and business upheaval. PLM projects, whether seen as allied to lean or not, are going to be a long time coming.

Unsurprisingly therefore, companies integrating their PDM/PLM systems with ERP show 4% done, just 3% doing it and 10% planning what will be an important link. Sadly



though, even fewer are thinking about integrating their CAD and ERP: just 1% have done it; 5% are implementing the connection now; and only 8% are planning an imminent project.

What about 3D CAD modelling itself? The best answer is 'could do better': 20% already have systems; but only 8% more are working on them now; and just 4% plan to implement 3D CAD within the next 18 months. The only consolation: a sizeable minority of those are taking advantage of seamless data interchange into the various aspects of production. For example, 15% have rolled out automated CAM/CNC tools, with 6% working on that now and 4% planning to; while 5% have completed integration of CAD into production engineering, 6% are working on it right now and 11% see the need to do so within the next 18 months.

Beyond that, more advanced lean implementations are clearly in their infancy. Just 5% have completed their installation of lean/agile collaborative engineering environments using appropriate IT, while only 3% are working on it now and 7% have plans for its execution. Also, 2% have extended that to include integrated product configurator systems to speed up sales processes where there is significant engineering input, with 6% currently developing the integration, but 11% planning it. And finally, just 5% have rolled out fully integrated estimating and quoting tools to lean-out their engineer-to-order processes, with 3% working on this project now and a further 3% planning it. ■

