



ERP Solutions in the Green Supply Chain and Multi-Mode Manufacturing

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Background

In December 2010, a study of middle market to large manufacturers was conducted by IFS North America and Affinity Research Solutions, a Boston-based research firm, among manufacturing executives and professionals to better understand how business software applications like ERP and EAM and other enterprise-wide software programs play a role in their company's green supply chain initiatives. While much is written about environmental regulation and its effect on manufacturing, not as much is written about how large manufacturers are requiring environmental data from their vendors and using it to drive purchasing decisions. This study attempts to illuminate how prevalent this trend is and how enterprise software is supporting manufactures by measuring the environmental impact of their supply chain as well as conforming to the green supply chain requirements of their customers.

Data was collected from manufacturing professionals on their involvement in the green supply chain, the types of environmental information they are tracking and sharing with their supply chain partners and/or customers, and the value they place on information about the environmental impact of their operations and those of their supply chain partners. In addition, the study took a close look at how data is being exchanged with suppliers on the environmental impact and chemical content of materials and products, regulation's role in driving change and how enterprise software could be integrated to better meet green supply chain requirements today and in the future.

Beyond evaluating green supply initiatives, this study also examines a number of business models manufacturers are engaged in. Specifically, the study examined the use of manufacturing modes such as 'make to stock,' 'make to order,' and 'assemble to order' and how enterprise software is being used to fit these various modes. The study further looks at how well enterprise software performs in each of the manufacturing modes and the frequency and precipitating events that lead to changes in current business models.

The major areas explored in this study include:

Green Supply Chain

- Manufacturers' various roles in the green supply chain process.
- Types of environmental information shared with customers and tracked with supply chain partners.
- Value/importance of environmental information such as overall impact on organization, impact of specific products and chemical content, and impact of logistics and transportation between suppliers and their location.
- Market-based and regulatory drivers prompting companies to adopt green initiatives.
- Current methods of exchanging environmental and chemical information with suppliers and partners and how enterprise software is helping to track and share this type of information.
- How effectively enterprise software is for manage green supply chain programs and how it can be improved to better facilitate green supply chain programs.

Multi-Mode Manufacturing

- Current business and manufacturing models, i.e., 'make to stock,' 'make to order,' 'engineer to order.'
- How enterprise software fits with various types of manufacturing modes and how it can be enhanced to accommodate multiple modes.
- How enterprise software performs in various modes of manufacturing.
- Frequency of change in manufacturing modes and what is prompting the change.



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The findings conclude that:

Green Supply Chain:

- Manufacturing professionals consider themselves and their companies willing participants in the green supply chain movement. Close to 70% say they make purchasing and sourcing decisions based on environmental impact, carbon footprint or other non-financial requirements, or that they are part of a green supply chain where at least one of their customers require information on the chemical makeup of their products and their company's environmental impact.
- Multiple types of environmental information are being tracked and shared with supply chain partners. The most common types of information being tracked are the company's overall environmental impact, the chemical content of individual products and/or discharges to the air, water or landfills during product life-cycle/end of life and those that are attributed to product manufacture.
- Manufacturers reported sharing fewer types of information with customers than they reported tracking among their own supply chain partners. The environmental data points most frequently shared with customers were still reported by less than half of the manufacturing professionals. These include chemical content of individual products and/or discharges to the air, water and landfills product manufacturing. The environmental data least frequently shared was the environmental impact of logistics and transportation necessary to transport materials within the supply chain.
- Manufacturing professionals said the most important environmental metric to have accurate information on was the chemical content of the products purchased by their organization. The environmental data least frequently requested from suppliers was environmental impact of logistics and transportation necessary to transport materials within the supply chain.
- Over the next 3 years, manufacturing professionals expect green supply chain initiatives to become more important. According to manufacturing professionals, the reasons for this trend include increased government regulations, greater awareness of environmental concerns and a push from customers to be more sustainable.
- When exchanging information with customers and suppliers, many manufacturing professionals are using traditional manual methods such as paper-based systems to manage environmental data. Others use a hybrid approach where they start out with hard copy but manually enter the information into an enterprise resource planning solution. Roughly 10% open up their enterprise software to their trading partners through portals to automate environmental and materials reporting through the supply chain.
- Manufacturing professionals are somewhat uncertain as to how their enterprise software could be enhanced to help them better manage their green supply chain requirements. Better than four out of ten indicate that their enterprise software solution does not allow them to track and/or share environmental data.
- Manufacturing professionals rate their current enterprise software solutions less than favorably in its ability to help manage their green supply chain initiative with only 5% rating it excellent.

Multi-Mode Manufacturing

- Better than 80% say their organization uses multiple manufacturing modes with 'make to order' at the top of the list followed by 'make to stock.' Only 15% say their enterprise software suite adequately handles all of the manufacturing modes they operate in.
- Current enterprise software solutions rate higher in manufacturing type modes such as 'made to stock,' and 'made to order' rather than engineering type functions including 'design, fabricate, erect,' and/or 'engineer to order.'
- Roughly three out of four say they have added at least one mode over the past five years. There are many reasons why they add or change modes, however customer demand ranks first followed by acquisitions and/or new products.



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Section I: Company's Role in the Green Supply Chain Supply Process

The majority of manufacturing companies surveyed are involved in the green supply chain either as active participants where they make purchasing and sourcing decisions based on environmental or other non-financial requirements or they are part of the green supply chain where at least one of their customers require them to provide information on the chemical makeup of their products' and company's environmental impact.

Company's Role in the Green Supply Chain Supply Process

	% of Respondents
We are a part of the green supply chain of one or more of our customers who require us to provide information on the chemical makeup of our products or other elements of our products' and company's environmental impact.	38%
We have an active green supply chain initiative and make purchasing and sourcing decisions based on environmental, carbon footprint or other non-financial requirements.	30%
We are currently not involved in a green supply chain , but expect to be in the next few years.	26%
We do not expect to be affected by green supply chains at all.	6%

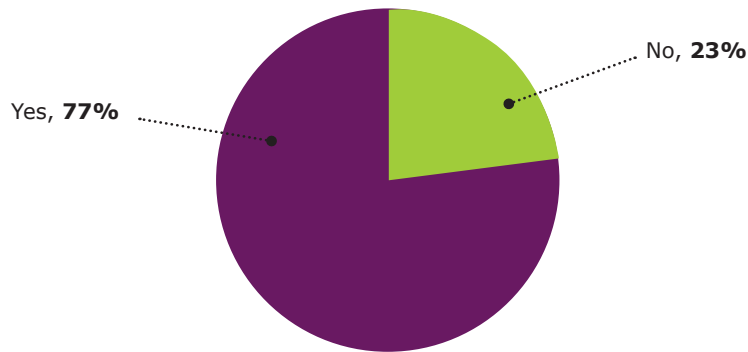


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Section II: Environmental Information

Almost 8 out of 10 manufacturing respondents are currently tracking and/or sharing environmental information with their supply chain partners and/or customers.

Do You Track and/or Share Environmental Information With Your Supply Chain Partners and/or Customers?



The types of environmental information being tracked and shared are numerous. Over three out of four manufacturing professionals say they track their company's overall environmental impact and/or, the impact of specific products or subassemblies, and/or chemical content of individual products. These are not always the same bits of information they share with their customers. In fact, the type of information mentioned most often that is shared with customers is chemical content of individual products.

Types of Information Being Tracked/Shared	Track	Share with Customers
Overall environment impact of the organization	80%	35%
Chemical content of individual products	77%	44%
Discharges to the air, water or landfills attributable to manufactured products	73%	36%
Environmental impact of the specific products or subassemblies	72%	35%
Discharges to the air, water or landfills during product lifecycle/end of life	71%	27%
Environmental impact of logistics and transport between suppliers/customers and your location	59%	22%
Carbon footprint	56%	24%

Other items that are tracked from their supply chain partners are: energy usage, HAACP items, MSDS, recycled material, REACH substances, castor oil, biodiversity initiatives, chemicals used in production, and product toxicity.

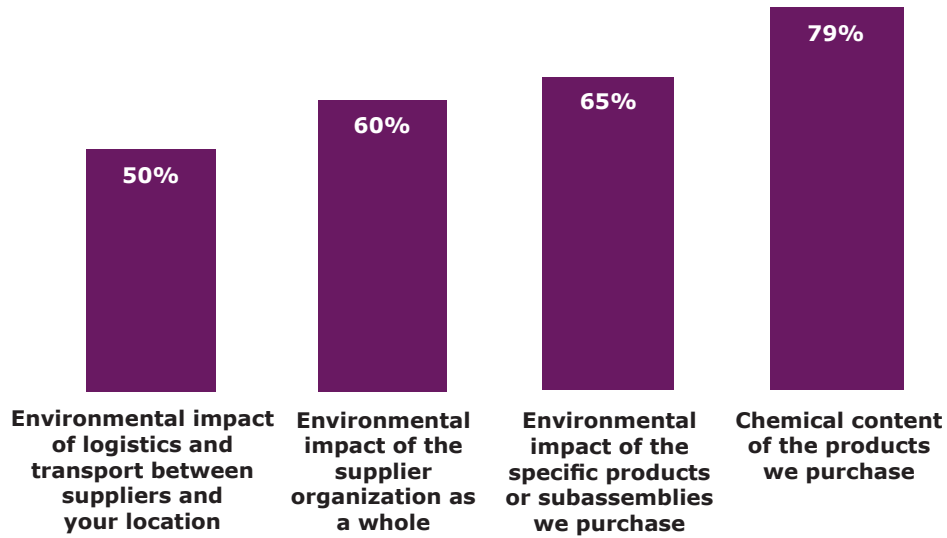


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Importance of Accurate Information:

Manufacturing professionals believe that the most important area to have accurate information is on the chemical content of the products they buy.

% Rating Most/Very Important to have Accurate Information



Other types of information considered very important are power savings, RoHS and lead-free initiatives, formaldehyde content on particle boards, MSDS sheets, RoHS and REACH compliance, CGMP, country of origin, chemical emissions and waste remediation.

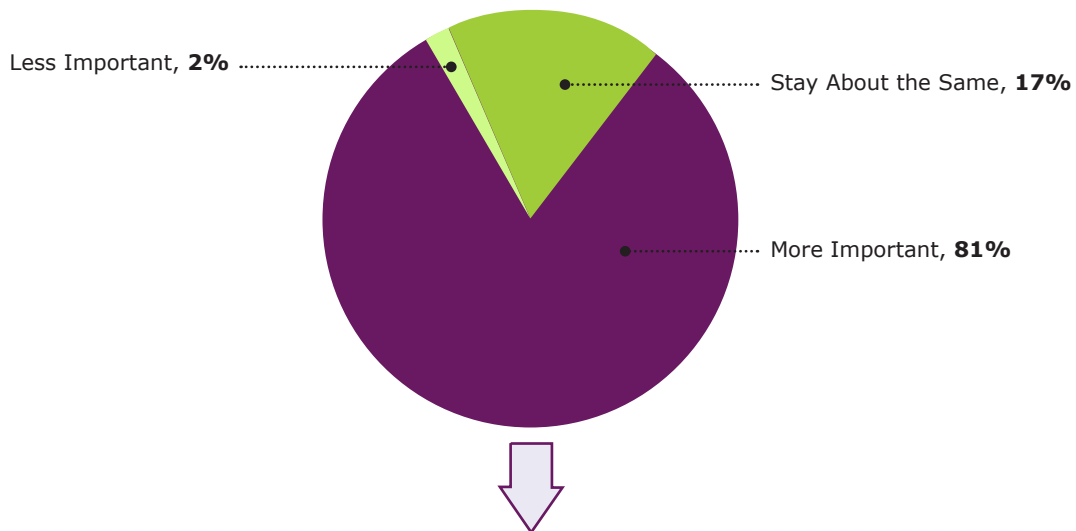


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Section III: Importance of Green Supply Initiatives

Over the next three years, implementing a green supply chain will be even more important than it is today. Reasons for this, according to manufacturing professionals, center around more government regulations, increased awareness for environmental concerns, and a push from customers to be more sustainable. As one professional stated, greening the supply chain is “not optional, its becoming the standard.”

Do You Expect Green Supply Chain Initiatives to Become More or Less Important in the Next Three Years?



Some reasons cited include:

“I see Green Supply Chain as a growing geo political issue”

“Green supply is now a selling point of our products and services.”

“Drives cost savings programs”

“There will be an increased pressure from customers”

“It is an opportunity to do right by the environment and the people who are our ultimate customers.”

“More requests by customers and suppliers on tracking this.”

“It’s been the goal of our company for the past 11 years and will continue.”

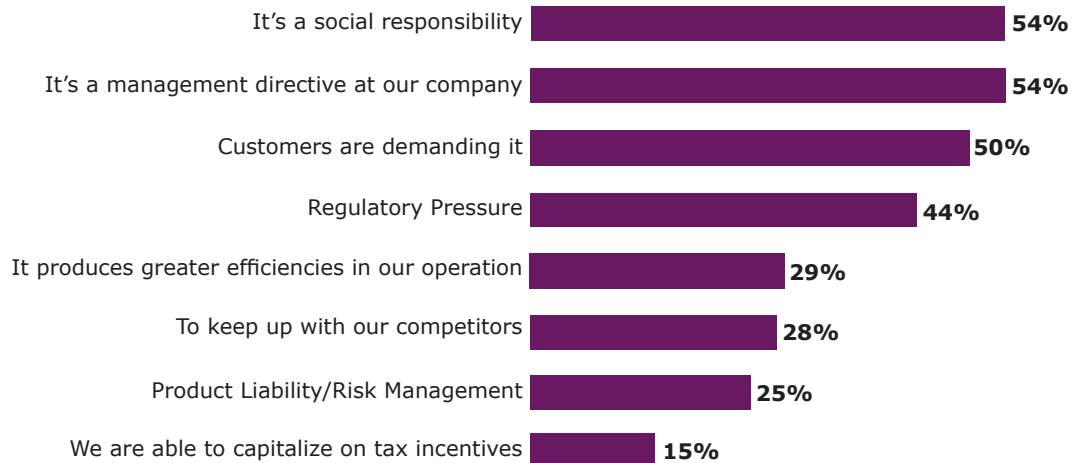
“With the product we produce we can reduce both emissions and energy cost to our supply chain by more than 30%.”



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Drivers to Adoption of Green Initiatives

When asked what's driving companies to adopt and implement green initiatives, manufacturing professionals cite being socially responsible, mandates by their company and customer pressures as the top reasons.



Regulations Impacting Business Today and in the Future

The regulations most impacting manufacturing organizations today and in the next two years are the Hazard Communication Standard (Material Safety Data Sheet), Clean Air Act, the Clear Water Act, and RoHS.

Regulations	Currently Impacting	Next Two Years
California WEEE	26%	24%
California REACH	24%	23%
California RoHS	34%	21%
Waste Electrical and Electronic Equipment Directive (WEEE)	47%	28%
Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)	55%	20%
Hazard Communication Standard 29 CFR 1910.1200 (Materials Safety Data Sheets)	68%	9%
Clean Air Act	69%	12%
Restriction of Hazardous Substances Directive (RoHS)	70%	13%
Clean Water Act	70%	12%



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Section IV: The Role of ERP and the Green Supply Chain

Data Exchange:

Among those manufacturing professionals that exchange data with their suppliers and customers regarding the environmental impact and chemical content of materials, products or components, a majority are using manual methods where they enter the information from hard copy into spreadsheets (28%) or into supply chain management solutions (16%) or into an ERP solution (20%). Roughly a fourth, 23% are using paper-based systems to manage this information.

Only 12% allow their trading partners to access a portal to automate environmental and materials reporting.

Ways of Exchanging Data with Customers and Suppliers	
We open our enterprise software like ERP sing portals to our trading partners to automate environmental and materials reporting through the supply chain.	12%
We start out with information in hard copy but enter it into a supply chain management solution.	16%
We start out with information in hard copy but enter it into an enterprise re-sources planning (ERP) solution.	20%
We have a hard copy, paper-based system to manage this data.	23%
We start out with information in hard copy but enter it into spreadsheets.	28%
We transfer data on environmental impact and chemical content electronically using a standard data format.	41%

Improving Enterprise Software:

There seems to be some uncertainty as to how enterprise software could be enhanced to help manufacturing professionals better manage their green supply chain requirements. Some comments centered on better integration of data.

“Improved integration and the ability for EDI back and forth between us and our supply chain.”

Others mentioned improving their visibility into the supply chain.

“Better capture and reporting of green supply chain issues.”

A few comments focused on going paperless and greater automation and efficiencies.

“Go from paper to electronic by reading / scanning documents”

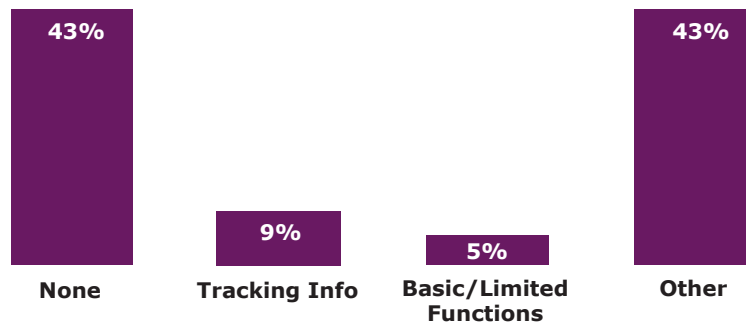
“Reduce paper waste”



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Current Enterprise Software Solution Ability to Track/Share Environmental Data as Part of a Green Supply Chain

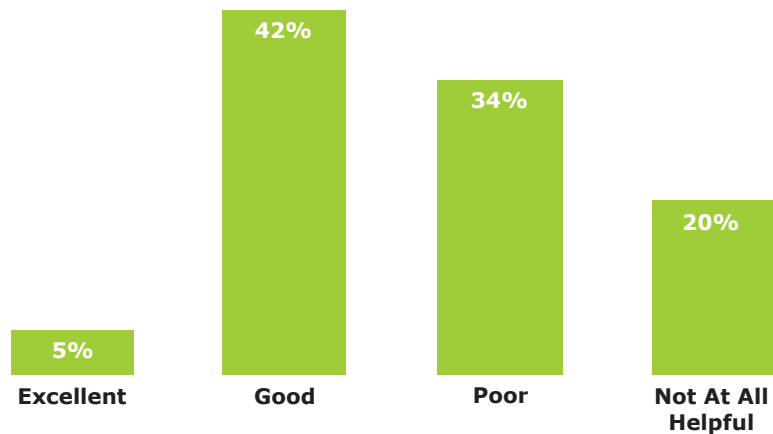
When asked, unprompted, what types of functions their enterprise software performs pertaining to its ability to track and share environmental information regarding their green supply chain initiatives, better than four out of ten (43%), couldn't identify any. At the same time, 57% did identify a function, but overall there was no general consensus on the types of function.



Room for Improvement

Manufacturing professionals were asked how helpful their enterprise software solution is in terms of its ability to help manage green supply chain initiatives. Slight over half rated their current enterprise solutions unfavorably in its ability to assist with their green supply chain requirements. Only 5% rated their enterprise software as excellent in this area.

Helpfulness in Managing Green Supply Chain



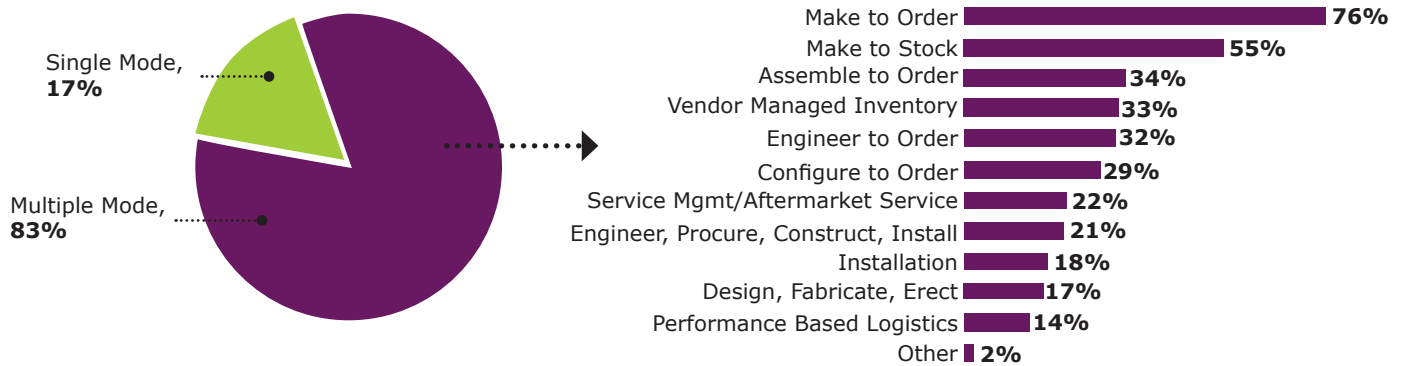


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Section V: Multi-Mode Manufacturing

Types of Manufacturing Modes

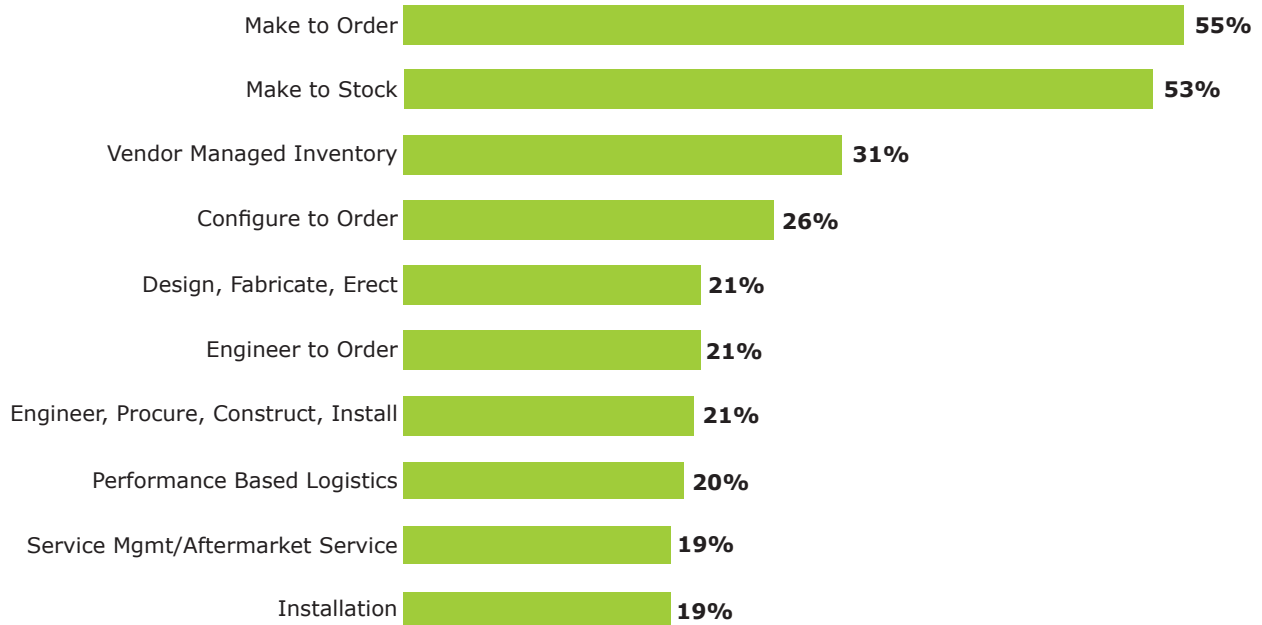
Manufacturing professionals were asked which manufacturing or business mode(s) their companies operate. Only 17% indicate working in just one mode while the vast majority, 83%, say they work in multiple modes with 'make to order' dominating all other modes followed by 'make to stock'.



Rating of Enterprise Software Capabilities on Modes

Current enterprise software solutions are rated more favorably on straightforward manufacturing functions such as 'make to stock' and 'make to order' and less favorably for engineering-intensive modes. Over half rated their enterprise software capabilities the highest in 'make to order' and 'make to stock.' The areas that their software solutions deliver the poorest is in installation, service management/aftermarket service, performance based logistics and engineer, procure, construct and install.

% Rating Enterprise Solution's Capabilities as Excellent/Very Good for Each Mode





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How Enterprise Software is Made to Fit Different Modes

When asked how their enterprise software accommodates different modes, over a third, 35%, say they modify their software to fit the various manufacturing modes that it could not accommodate out of the box. Roughly a fourth, 27%, say their software suite can handle most of the manufacturing modes, while 20% are running separate software products for various aspects of their business. Only 15% say their enterprise software suite adequately handles all of the different modes.

Ways Enterprise Software is Made to Fit Different Modes	
We modified our enterprise software to accommodate manufacturing modes it could not handle out of the box.	35%
Our enterprise software suite adequately handles most of the manufacturing modes we operate in and we find manual work-arounds for the rest.	27%
We run separate enterprise software products for different portions of our business.	20%
Our enterprise software suite adequately handles all of the manufacturing modes in which we operate.	15%
Other	3%

When asked, unprompted, how their enterprise software could be improved to accommodate multiple modes of manufacturing, a third, 33%, could not offer any suggestions. Some specific suggestions addressed issues of flexibility, better integration, improved interfaces and easier to use features.

"More flexible configuration options"

"Allow for a common set of core applications that execute according to the manufacturing mode of each business unit, sharing a common standard data structure but processing business rules according to mode."

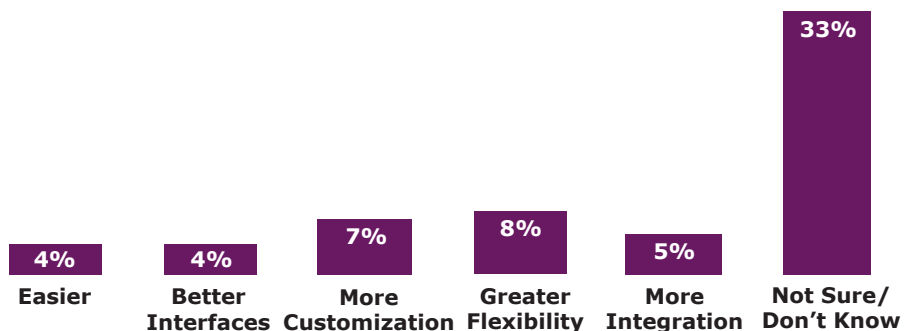
"Integration with independent packages and creation of an interface between them"

"Replace all legacy systems with a fully integrated single ERP"

"Open Interfaces"

"By interfacing engineering with the ERP"

Ways Enterprise Software can be Enhanced to Accommodate Multiple Modes

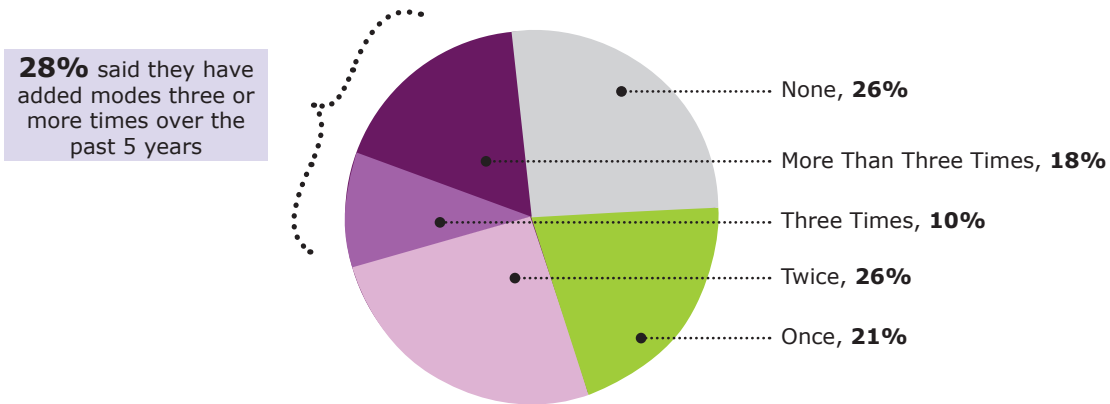




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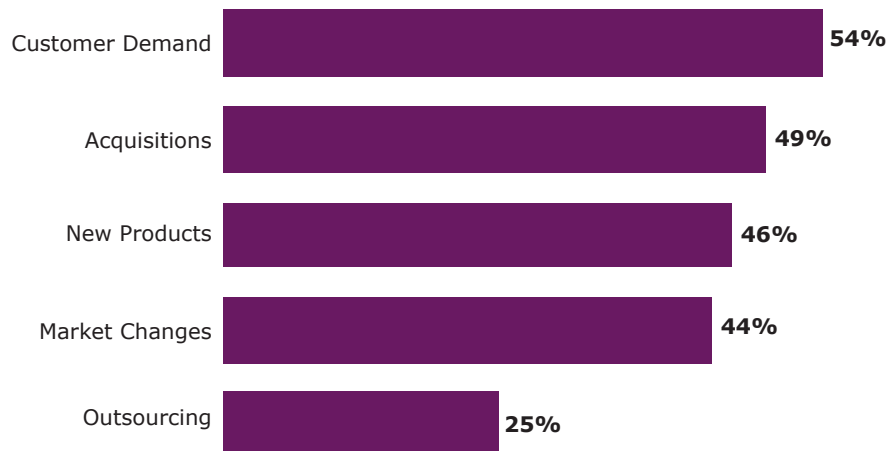
Change in Modes

Over the past five years, more than half, 54%, say they have added modes at least twice.



Types of Events that Impact Manufacturing Modes

More than half say the reason they change modes in their organization is due to customer demand. Just under half say acquisitions prompt a change in modes.





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Methodology

This research was conducted collaboratively with Affinity Research Solutions and **IFSNorth America, the Americas subsidiary** of a provider of enterprise resource planning (ERP), enterprise asset management (EAM) and other enterprise solutions. In February of 2009, IFS became the first major enterprise software vendor to offer an embedded environmental footprint management tool, and wanted to learn more about the appeal that this functionality had in the market. They also target companies running multiple manufacturing modes, and wanted to gather input on the perceptions and priorities of companies in their targeted demographic.

The study was executed in December 2010 and was administered over the Internet among subscribers of **Manufacturing Business Technology (MBT)**. Respondents were pre-qualified for being involved in decisions regarding ERP applications and related software solutions for their company. Individuals were further qualified for being employed in companies estimating 2010 revenues at \$100 million or more.

In total, 207 corporate, operations, and IT executives and managers in manufacturing companies participated in this study.

About the Respondents and Their Facilities

Respondents to the study are largely senior IT and manufacturing operations management (22%), design or control engineers (17%), supply chain executives (11%), consultants and systems integrators (10%), procurement executives (9%), operations and plant managers (8%), corporate executives (3%).

A broad range of industries are represented and includes aerospace/defense, industrial machinery, petroleum, automotive and transportation, wood and paper, chemicals, food and beverage, metals, computer systems and medical devices, etc.

Respondents were classified into three categories based on their organizations: 2010 projected revenues: companies under \$250 million (28%), businesses reporting revenues between \$250 million and \$999.9 million (26%) and organizations having \$1 billion or more in sales (46%).

About IFS AB.

IFS is a public company (OMX STO: IFS) founded in 1983 that develops, supplies, and implements IFS Applications™, a component-based extended ERP suite built on SOA technology. IFS focuses on agile businesses where any of four core processes are strategic: Service & asset management, manufacturing, supply chain and projects. The company has 2,000 customers and is present in more than 50 countries with 2,700 employees in total.

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