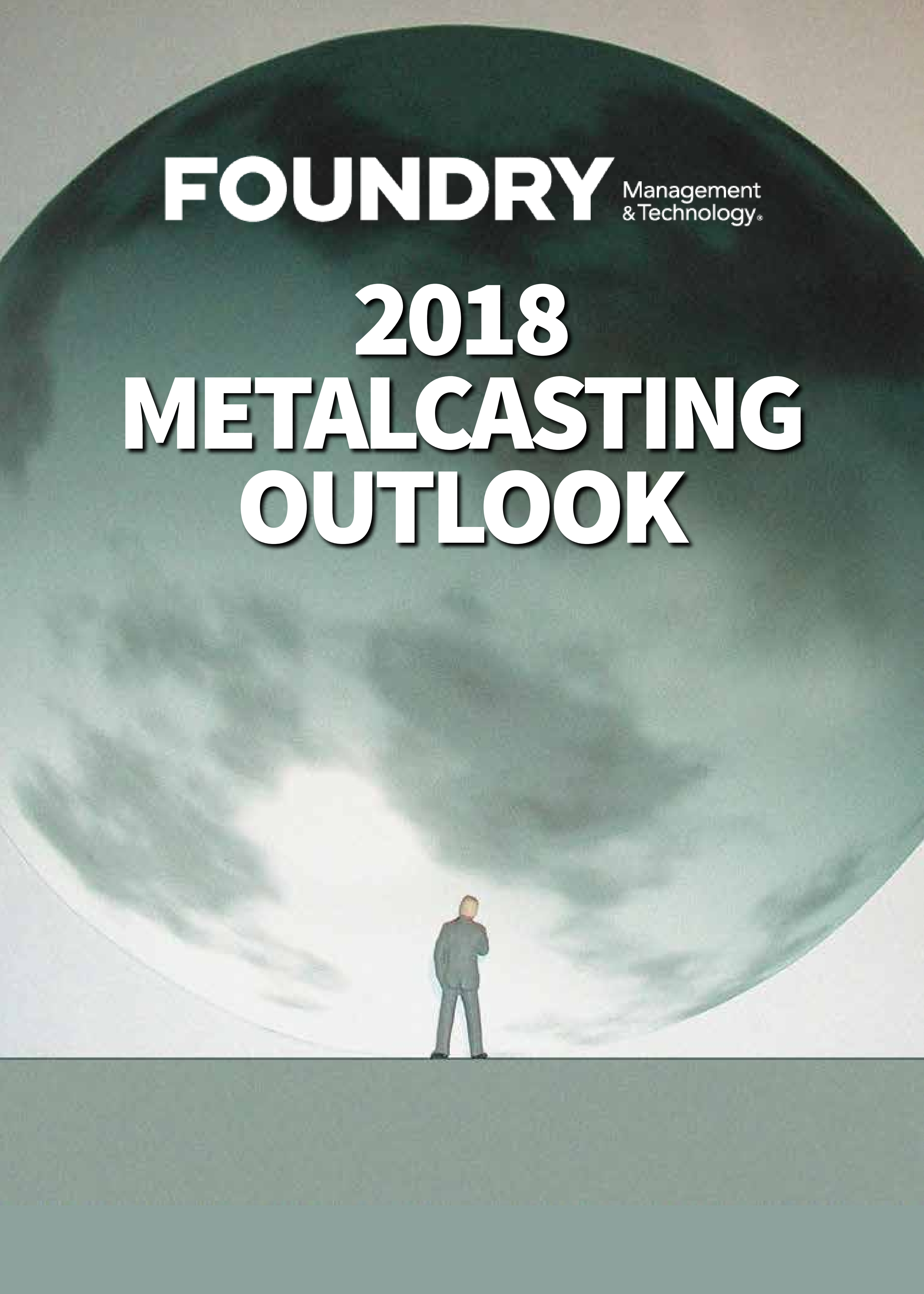
FOUNDRY Management & Technology

2018 METALCASTING OUTLOOK



Managers and executives of North American foundries and diecasters evaluate current business conditions, and give their perspectives on the factors shaping the metalcasting sector's growth prospects in the coming year.

As 2017 closes and 2018 approaches, any reliable evaluation of U.S. industrial and manufacturing economics will portray a positive outlook. But economics is unstable and unpredictable; business conditions are prone to sudden reversals, a condition that has been made more volatile, not less, by the wider availability of data and the immediate pace of communication in the current age. More than this, general analysis of economics becomes less relevant and reliable as the discussion narrows on particular market sectors and industries.

This is the reason the *Foundry Management & Technology* undertakes to survey metalcasters on an annual basis – to gauge their perceptions and predictions of the current and developing conditions in their business sector.

Of course, metalcasters are an irreplaceable part of the industrial economy, and are influenced by the overall conditions. In the most recent edition of the Institute for Supply Management's Manufacturing Report, economic activity in the manufacturing sector was found to have expanded during October, as the wider U.S. economy expanded for the 101st consecutive month. The ISM New Orders Index for manufactured goods was found to have declined slightly (-1.2%) from September; and a comparable decline (-1.2%) from September was reported in the ISM Production Index.

Such declines seem to be negligible at the moment — after all, 16 of 18 manufacturing industries making up the ISM index expanded during October, including transportation, machinery, and primary metals. But, the greater problem for an individual seeking to understand the effects of such trends is the accelerating influence of high technology at the production levels of manufacturing, and the increasing autonomy of individuals making decisions in these operations.

The challenge in economic forecasting has always been to derive and apply timely information, and that is even more relevant in an age of accelerated communication. But, the forecasts perform different functions for manufacturing operators and strategists than for investors or financial analysts. Both need information in order to make critical decisions, but for operators like metalcasters the decision must be made in a competitive setting, informing their innate understanding and judgment of conditions in their businesses. That is the objective for the *Foundry Management & Technology* Business Outlook survey.

How it works — Every October, *FM&T* surveys metalcasters to capture the insights, concerns, and expectations of men and women working in North America's foundries and diecasting plants. We seek to understand not only the current operating circumstances for these enterprises, but also the underlying conditions shaping the businesses, and how these are received and understood by the industry's decision-makers. We want to take

Q1. What is the principal metal that you cast?

Aluminum	18.60%
Brass/Bronze	9.30%
Ductile Iron	16.28%
Gray Iron	19.77%
Steel	20.93%
Other	15.12%

Q2. How many employees work in your metalcasting operation?

Under 20	19.77%
20 to 49	24.42%
50 to 99	16.28%
100 to 249	12.79%
Over 250	26.74%

Q3. How will your 2017 casting shipments (tonnage) compare with 2016 shipments?

Stay the same	24.42%
Increase	62.79%
Decrease	12.79%

Q4. If you selected "increase" for Q3, by what percentage (estimate)?

0-10%	45.00%
10-25%	45.00%
26-50%	5.00%
51-75%	3.33%
76-90%	0.00%
+90%	1.67%

account of the problems the they face in their businesses and the economy, to learn what plans they're making for the coming business cycle, and to understand better their expectations for the year now approaching.

We surveyed readers by email over a period of four weeks. The results include responses from dozens of readers who represent the full variety of foundries and diecasters: 20.9% named steel (of any alloy or quality) as the principle metal cast at their plant; 19.8% cast mainly gray iron. Ductile iron foundries comprise 16.3% of the respondents; casting aluminum alloys is the main line of business for 18.6% of respondents. While brass and bronze alloys represent 9.3% of the respondents, 15.1% of the respondents cast alloys categorized as "other," which may include magnesium, titanium, stainless steel, or some other material.

Similarly, the survey is designed to portray the full scope of operations active in metalcasting today: 26.7% of the survey respondents are employed at large foundries, with over 250 employees; 24.4% are attached to businesses with 20 to 49 employees; and 19.8% are employed at businesses with less than 20 employees. Another 16.3% are employed by businesses with 50 to 99 employees; and 12.8% are at work for businesses with 100 to 249 workers. Thus, as with the distribution of the metals being cast by the survey respondents' plants, the full spectrum of employment conditions and concerns are reflected in the survey results.

Sense of place — We started the Outlook survey by establishing the respondents' sense of recent and current metalcasting business conditions — using 2017 casting shipment volumes (tonnage) as a frame in which to characterize their estimations. The survey respondents are overwhelmingly positive about their current conditions, as 62.8% indicate the current year's shipment totals will improve on the 2016 results. Beyond these, roughly a quarter (24.4%) of all respondents believe the 2017 results will be even with the 2016 results. Only 12.8% of the respondents report the current year's shipment total will fall behind the 2016 results.

Among the larger, more optimistic respondents' pool, a near-majority (45%) estimates their 2017 shipment tonnage

Q5. If you selected "decrease" for Q3, by what percentage (estimate)?

0-10%	47.06%
10-25%	47.06%
26-50%	5.88%
51-75%	0.00%
76-90%	0.00%
+90%	0.00%

Q6. How do you expect your 2018 casting shipments (tonnage) to compare with 2017 shipments?

Stay the same	30.95%
Increase	64.29%
Decrease	4.76%

Q7. If you selected "increase" for Q6, by what percentage (estimate)?

0-10%	39.34%
10-25%	50.82%
26-50%	8.20%
51-75%	0.00%
76-90%	1.64%
+90%	0.00%

Q8. If you selected "decrease" for Q6, by what percentage (estimate)?

0-10%	72.73%
10-25%	27.27%
26-50%	0.00%
51-75%	0.00%
76-90%	0.00%
+90%	0.00%

Q9. How will your 2018 capital expenditures compare to your 2017 capital expenditures?

Stay the same	44.05%
Increase	47.62%
Decrease	8.33%

Q10. If you selected "increase" for Q9, by what percentage (estimate)?

0-10%	26.67%
10-25%	42.22%
26-50%	17.78%
51-75%	6.67%
76-90%	2.22%
+90%	4.44%

Q11. If you selected "decrease" for Q9, by what percentage (estimate)?

0-10%	46.15%
10-25%	30.77%
26-50%	7.69%
51-75%	15.38%
76-90%	0.00%
+90%	0.00%

will rise by up to 10%, year-over-year; and a comparable number (45%) forecast the 2017 rise will be in the 10-25% range. Another 5.0% of respondents see the tonnage increase in the range of 26-50%; and 1.7% predict an increase above 90% for the current year.

As for the less optimistic respondents, 47.0% forecast their 2017 shipment declines will be in the 0-10% range; and another 47.0% forecast the decline will be in the 10-25% range.

The survey took the same approach to evaluate respondents sense of 2018 business prospects, again in terms of tons-shipped. Again, the optimists have the edge: 64.3% anticipate casting shipments volumes will rise during the year ahead, and 30.1% forecast the volumes will remain even with the 2017 totals. Just 4.8% expect 2018 casting shipments to fall below current-year results.

Among these responses, we found that the 47.0% of all respondents who foresee rising casting shipments totals in 2018, 50.8% expect that rise to be in the 10-25% range; 39.3% expect the rise to be in the 0-10% range; and 8.2% see the increase in the range of 26-50%.

On the other side of this point, the small minority who anticipate decreasing casting tonnages in 2018, 72.7% expect that decrease to range from 0 to 10%. The remaining 27.3% expect that decline to be in 10-25% range.

CapEx consequences — The next phase of the survey seeks to gauge metalcasters' confidence in a different context: capital investments. Asked to compare their businesses' 2017 and 2018 capital expenditure totals, a near-majority (47.6%) revealed their expectation for rising CapEx totals in the year ahead. Another 44.0% expect the capital investment level to remain even from 2017 through 2018; and a small minority (8.3%) see CapEx levels declining from this year to next year.

Among the more positive (47.6%) segment of these respondents, the survey revealed that a plurality (42.2%) expect that CapEx rise to come in the 10-25% range; 26.7% foresee the increase ranging from 0 to 10%; and 17.9% see the increase ranging from 26-50% of the current year's investment value.

Opposite all these, the much-smaller less-confident segment of respondents who foresee CapEx levels declining in 2018, nearly half (46.15%) peg the decline to range from 0 to 10%, and 30.8% estimate the decline to be in the 10-25% range. Further, 15.9% estimate the CapEx levels to fall by 51-75%; and 7.7% project the decrease to be in the 26-50% range.

Seeking more clarity, we asked respondents to characterize the types of capital-spending programs they have slated for 2018. More than two-thirds of respondents – 67.9% of the total – plan to invest in new manufacturing equipment. Nearly a

Q12. What types of capital expenditures are you planning in 2018?

New Plant	4.76%
New Equipment	67.86%
Expansion/Addition to existing plant	19.05%
None	19.05%

Q13. Please estimate your total planned capital expenditures for 2018.

Less that $100,000	27.16%
$101,000 to $250,000	22.22%
$251,000 to $500,000	17.28%
$500,000 to $1 million	17.28%
$1 million to $5 million	11.11%
More than $5 million	4.94%

Q14. What are your borrowing plans for 2018?

More debt	7.06%
Retire debt	12.94%
Stay about the same	55.29%
Not currently carrying any debt	24.71%

Q15. Do you plan to purchase any of the following types of equipment in 2018?

Air compressors	11.39%
Automatic pouring system	8.86%
Blast cleaning equipment	12.66%
Continuous mixers	11.39%
Conveyors	24.05%
Coremaking machines	12.66%
Cranes/hoists	17.72%
Cutoff equipment	12.66%
Design software/hardware	17.72%
Diecasting machines	3.80%
Grinding equipment	26.58%
Heat treating equipment	12.66%
Investment casting system	2.53%
Lab equipment	25.32%
Lift trucks or loaders	18.99%
Lost foam system	0.00%
Machine tools	17.72%
Melting equipment	16.46%
Molding machines	10.13%
Permanent mold system	2.53%
Pollution controls	24.05%
Power control equipment/systems	2.53%
Process computers	3.80%
Rapid prototyping equipment	5.06%
Robots/manipulators	24.05%
Sand Prep equipment	6.33%
Sand reclaimation equipment	11.39%
Shakeout/punchout equipment	6.33%
Simulation software	8.86%
Testing/inspection equipment	18.99%
Other	10.13%

fifth of all respondents – 19.0% - have plans for expansions or additions to the existing metalcasting plant; and 4.8% of respondents indicated plans for new plant projects in 2018.

Another fifth of all respondents – 19.0% - indicated no major capital spending programs are planned for 2018.

The value of capital-spending plans in 2018 is an important point of understanding in this discussion. Slightly more than a quarter of all respondents – 27.2% — revealed their business's capital-spending programs are worth $100,000 or less; 22.2% have plans worth $100,000-$250,000; 17.3% foresee spending in the $250,000-$500,000 range; and the same number (17.3%) expect the spending to range from $500,000 to $1 million.

Ranging still higher, 11.1% of respondents with CapEx plans for 2018 estimate their projects to be valued from $1 million to $5 million, and 4.9% see the increase ranging over $5 million.

Interestingly, most respondents' (55.3%) capital projects will be carried out without increasing the organizations' borrowing plans. Only 7.0% of respondents anticipate increase the levels of debt they are currently carrying.

Down to specifics — Listing specific metalcasters' specific CapEx plans gives a portrait of current concerns, showing where there is need for new or improved production and results. It reveals an apparent need for technologies that will improve the process of finishing castings, verifying the compositional quality of cast materials, or making plants perform more efficiently or achieve higher throughput.

Respondents were invited to identify all of the product areas in which they plan to invest during 2018, so the total will exceed 100%. And still, it's revealing that more than a quarter of all respondents expect to invest in grinding equipment (higher standards for finished parts), laboratory equipment (better product quality and higher quality compliance), conveyors (better production efficiency and/or higher throughput), and pollution controls (improved environmental compliance.) Each of these production prerogatives are underscored in the other high-ranking spending targets for 2018.

Shaping decision-making — In addition to evaluating metalcasting production conditions and strategic plans, the Business Outlook survey seeks to identify the factors that shape managers decision-making. We asked survey respondents to identify the issues that have challenged their management skills or resources during 2017. Again, the format of the question allowed respondents to make multiple selections, so the results exceed 100%.

By a wide margin (42.17%) of all respondents identified

Q16. Indicate which of the following issues have been significant problems for your operation during 2017:

Availability of Capital	18.07%
Energy Costs	27.71%
Energy Shortages	4.82%
EPA Requirements	18.07%
Human Resources	32.53%
Imported Castings	16.87%
Interest Rates	1.20%
Labor Costs	21.69%
Labor Shortage	42.17%
Lack of Orders	26.51%
Material Shortages	10.84%
Medical/Insurance Costs	25.30%
On-Time Delivery of Castings	9.64%
OSHA Requirements	25.30%
Plant Management	8.43%
Plant Operations	7.23%
Product Liability	2.41%
Product Marketing/Sales	3.61%
Quality of Castings	16.87%
Raw Materials Cost	19.28%
Training	13.25%
Workers' Compensation Costs	7.23%
Other	3.61%

Q17. Indicate which of the following issues are likely to be significant problems for your operation in 2018:

Availability of Capital	12.35%
Energy Costs	29.63%
Energy Shortages	0.00%
EPA Requirements	14.81%
Human Resources	16.05%
Imported Castings	11.11%
Interest Rates	3.70%
Labor Costs	19.75%
Labor Shortage	41.98%
Lack of Orders	16.05%
Material Shortages	11.11%
Medical/Insurance Costs	24.69%
On-Time Delivery of Castings	9.88%
OSHA Requirements	25.93%
Plant Management	3.70%
Plant Operations	4.94%
Product Liability	1.23%
Product Marketing/Sales	4.94%
Quality of Castings	17.28%
Raw Materials Cost	20.99%
Training	12.35%
Workers' Compensation Costs	3.70%
Other	3.70%

Q18. How are casting imports affecting your business?

No affect	36.59%
Becoming more of a competitive factor	37.80%
Becoming less of a competitive factor	20.73%
We're building our own export business	4.88%

Labor Shortages the foremost challenge to successful operation, followed by a similar "problem," Human Resources (32.53%); and Medical/Insurance Costs (25.3%.)

Beyond personnel development and management, other top-ranking problems for 2017 included Energy Costs (27.7%) and Raw Material Costs (19.28%); OSHA Requirements (25.3%) and EPA Requirements (18.1%); and the Availability of Capital (18.1%), Casting Imports (16.9%) and Casting Quality (16.9%).

The same question was asked with a "forward" spin, seeking to identify the problems metalcasters anticipate in their working plans during 2018. Once again, the leading concern indicated by 41.9% of respondents is the Labor Shortage will make staffing of operations problematic in the coming year. High numbers of respondents are sensing that Energy Costs (29.6%), OSHA Requirements (25.93%), Medical/Insurance Costs (24.7%), Raw Material Costs (20.99%), and Labor Costs (19.75%) — suggesting generalized concerns among metalcasters of fundamental inflation in manufacturing and the wider economy.

With that prospect in mind, we proposed questions that would help define the respondents' confidence in the current business climate, and their expectations for changes in 2018.

Knowing that most respondents have indicated some satisfaction with the current activities of their own business, and most also expect some measurable improvement in their results during the coming year, it is surprising to discover that most respondents are affiliated with metalcasting operations that are operating somewhat below the maximum available capacity.

Just 3.6% of respondents reported that full-capacity/100% describes the "normal" rate of production at their operation; and just 9.6% indicated a "normal" rate in the 91-100% range.

Even 76-90% does not qualify as "normal" for more than 21.7% of respondents. The largest pool of respondents to this question (30.12%) indicated that the normal operating rate at their location ranges from 60-75% of full capacity.

Filling in the foreground — With these insights as background, it's easier to understand the results of the following question – which asked respondents to gauge the prospects for U.S. economic growth (GDP) during 2018. Less than 20% expect GDP to improve significantly (17.65%) but more than half (54.1%) are anticipating that the overall economy will deliver some notable degree of expansion.

The less optimistic views hold diminishing margins in this poll question: 17.65% expect economic conditions to remain "about the same"; 8.2% expect to see some decline; and 2.35% are predicting a dramatic decline in U.S. GDP.

The U.S. economy is proceeding toward its ninth full year of economic growth and expansion, which is a matter of great accomplishment for manufacturers.

But, the more difficult challenge to manufacturers, not least to metalcasters, is the disruption caused by advanced technologies at the most basic levels of production — raising standards for precision in process and quality control, accelerating the flow of information into and out from the plant, and making the managers' decision-making process more and more consequential.

Q19. Please explain in detail your response to Q18:

Answered	40
Skipped	46

Q20. What percentage of "normal" plant capacity is represented by your 2017 average monthly casting production? ("Normal" being the number of employees, shifts, and days your plant typically operates.)

0-50%	18.07%
51-60%	16.87%
60-75%	30.12%
76-90%	21.69%
91-100%	9.64%
+100%	3.61%

Q21. How do you feel the overall U.S. economy (GDP) will perform in 2018 compared to 2017?

Significantly Improve	17.65%
Improve Somewhat	54.12%
Remain About The Same	17.65%
Decline Somewhat	8.24%
Decline Dramatically	2.35%

Q22. Do you plan to increase employment totals during 2018?

Yes	63.53%
No	36.47%

Q23. Which of these will be most effective at encouraging professional growth in metalcasting?

Additional scholarships and internships	15.58%
Additional or alternate training programs (programs at colleges, trade schools)	40.26%
More active involvement of metalcasters with trade associations and colleges	31.17%
New professional associations (geographical? market-focused? industry-specific etc.)	12.99%

Q24. Which of these market areas offers the most promise for the growth of your metalcasting operation?

Alternative energy (nuclear, wind, solar)	8.33%
Automotive engines	10.71%
Other automotive components	15.48%
Off-road vehicle and equipment	8.33%
Medical / surgical equipment or devices	1.19%
Infrastructure and construction	27.38%
Oil/natural gas	13.10%
Other, please specify	3.57%
None of the above	11.90%