Digital re-definery

Get inside the new digital future of refining with our Digital Refining Survey 2019
This overview offers highlights from the third annual Accenture Digital Refining Survey, conducted by OGJ Research on behalf of Accenture.

It is an online survey of 145 oil refining and gas industry professionals from a cross-segment of the industry, including:

- Engineers
- Mid-level and executive management
- Business unit heads and staff
- Project managers

The survey was conducted in January 2019 by OGJ Research in partnership with the Oil and Gas Journal. Respondents are subscribers to PennWell publications.
Accenture partnered with OGJ Research Center to conduct the third annual Accenture Digital Refining Survey to understand how organizations are using digital technologies in the refining area of their business.

In addition, the survey sought to understand what respondents believed were the benefits and barriers to adopting digital technologies.

The 2019 survey was sent to 5,214 potential OGJ Research participants. The survey was also sent out through Accenture and Solomon Associates. Complete responses were received from 145 individuals (the 2018 survey was sent to 8,320 potential PennWell participants. Complete responses were received from 169 individuals).

The confidence level for the survey is 95% with a margin of error of 8.45% (the 2018 confidence level for the survey was 95% with a margin of error of 7.5%).

### Respondent location:

<table>
<thead>
<tr>
<th>Location</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia/New Zealand</td>
<td>2.91%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Africa</td>
<td>5.23%</td>
<td>3.45%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>19.19%</td>
<td>16.55%</td>
</tr>
<tr>
<td>Europe</td>
<td>14.55%</td>
<td>12.41%</td>
</tr>
<tr>
<td>Middle East</td>
<td>6.40%</td>
<td>5.52%</td>
</tr>
<tr>
<td>Russia/Central Asia</td>
<td>0.58%</td>
<td>0.68%</td>
</tr>
<tr>
<td>Latin America</td>
<td>11.64%</td>
<td>8.97%</td>
</tr>
<tr>
<td>North America</td>
<td>32.50%</td>
<td>46.21%</td>
</tr>
<tr>
<td>World</td>
<td>7.00%</td>
<td>6.21%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
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### Respondent title:

<table>
<thead>
<tr>
<th>Title</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-Level</td>
<td>9.88%</td>
<td>11.72%</td>
</tr>
<tr>
<td>Senior VP or VP</td>
<td>8.14%</td>
<td>6.90%</td>
</tr>
<tr>
<td>Managing Director or Director</td>
<td>12.79%</td>
<td>13.10%</td>
</tr>
<tr>
<td>Mid Level Manager/BU Manager</td>
<td>6.40%</td>
<td>4.14%</td>
</tr>
<tr>
<td>Business Unit Head</td>
<td>8.16%</td>
<td>6.90%</td>
</tr>
<tr>
<td>Engineer</td>
<td>15.70%</td>
<td>17.93%</td>
</tr>
<tr>
<td>Project Manager</td>
<td>7.56%</td>
<td>16.55%</td>
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<tr>
<td>Refinery Economist</td>
<td>6.97%</td>
<td>6.21%</td>
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<tr>
<td>Information Technology</td>
<td>9.30%</td>
<td>2.07%</td>
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<tr>
<td>Other</td>
<td>15.10%</td>
<td>14.48%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
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</tbody>
</table>

### Company type:

<table>
<thead>
<tr>
<th>Type</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>13.60%</td>
<td>19.31%</td>
</tr>
<tr>
<td>Contractor</td>
<td>9.25%</td>
<td>11.03%</td>
</tr>
<tr>
<td>Independent Refining Company</td>
<td>27.21%</td>
<td>20.69%</td>
</tr>
<tr>
<td>International Oil Company</td>
<td>18.00%</td>
<td>15.86%</td>
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<tr>
<td>National Oil Company</td>
<td>30.20%</td>
<td>26.90%</td>
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<tr>
<td>Other</td>
<td>1.74%</td>
<td>6.21%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
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TREND 1
DIGITAL TRANSFORMATION IN REFINING: IN PROGRESS
Nearly 60% of refiners are investing more or significantly more in digital than in 2018. Some basic margin improvements have resulted from data analytics, platforms and the Internet of Things (IoT).

TREND 2
DIGITAL BENEFITS WILL BE ENABLED BY FUTURE INVESTMENTS
Nearly 60% of refiners see the highest benefits from digital when applied to production planning and execution, followed by maintenance and reliability. Future investments target greater process and asset optimization and further automation.

TREND 3
RESISTANCE TO DIGITAL ADOPTION IS RISING, FORCING A GREATER FOCUS ON PEOPLE PRIORITIES
Cost is no longer the top barrier to digital adoption with concerns falling for the first time in three years. Refiners are realizing that the last mile of digital transformation around organization and people changes is very hard to achieve.

TREND 4
MATURITY REALITY CHECK: DIGITAL IS HARD TO SCALE
Fewer refiners called themselves “digitally mature” this year. The convergence of IT and OT architectures and organizational roles and priorities are limiting the speed to maturity, as many still struggle to address this.

TREND 5
REFINERS ARE SEEKING PARTNERS TO BETTER SUPPORT THEIR DIGITAL JOURNEYS
Less than one-quarter of refiners said they will improve their digital capabilities in-house. Most are looking for support from the wider ecosystem and from partnerships to scale digital and realize its value.
Digital transformation in refining: In progress

Refiners have increased digital investment, focusing on core manufacturing processes, which has resulted in some margin improvements.
Nearly 60% of refiners, compared to ~50% in 2018, stated that they are investing more or significantly more. This has resulted in margin improvements that have come mostly from data analytics, platforms and IoT, sensors and edge computing.

Refiners are looking to drive more value from digital by focusing on areas such as production planning and execution, engineering and capital projects and enterprise functions.

The digital solutions driving the greatest margin improvement for refiners are analytics and platforms – resulting in baseline margin improvements, but at much lower rates than previous years.

We believe that the challenge of achieving scale for digital initiatives across an asset base is stopping refiners from capturing further digital value.
**Digital investment continues to increase and support margins**

What percentage of refining margin improvement have you seen from digital technologies in the past 12 months?

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 10%</td>
<td>3%</td>
<td>11%</td>
</tr>
<tr>
<td>7–10%</td>
<td>19%</td>
<td>11%</td>
</tr>
<tr>
<td>2–6%</td>
<td>38%</td>
<td>46%</td>
</tr>
<tr>
<td>0–1%</td>
<td>19%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Are you currently investing more or less in digital technology than you were 12 months ago?

- Significantly more (20% or greater): 1% in 2019, 4% in 2018
- More (1–19% more): 5% in 2019, 4% in 2018
- The same: 34% in 2019, 37% in 2018
- Less (1–19% less): 19% in 2019, 19% in 2018
- Significantly less (20% or greater): 1% in 2019, 1% in 2018
- Don’t know: 11% in 2019, 11% in 2018

In 2019, nearly 60% of refiners are investing more/significantly more than in 2018.

Responses add up to 100%. All responses shown.
TREND 2

Digital benefits will be enabled by future investments

Refiners are seeing the benefits of digital across their operations. Future investments target greater process and asset optimization and further automation.
Nearly 60% of refiners say production planning and execution processes saw the most positive impact from digital.

Cost effectiveness and efficiencies are also seen in maintenance and reliability and engineering and capital projects.

Refiners are now targeting their digital investments in process optimization, predictive asset management and greater plant automation.

While there have been good results from platform investments over the past few years, this area is not a top target area for future investment in 2019.

Refiners are focusing future investment on: driving efficiency at their plants; leveraging capital efficiency (as the market returns to growth) more automation and data security.

There are some areas to target however: refiners rate the impact of digital on addressing environmental and licence to operate issues relatively low, despite increasing awareness and activism by both the public and investors in this area.
Digital benefits will be enabled by future investments

In which areas of your refining operations are digital technologies having the most positive impact? Rank your top 3 (%)

- Production planning & execution: 59%
- Maintenance & reliability: 50%
- Engineering & capital projects: 30%
- Health, safety & environmental: 29%
- Energy management: 25%
- Hydrocarbon supply chain / value chain optimization: 23%

In which of the following areas is your company planning to invest in over the next 3 years to improve the efficiency and productivity of your refinery/refining portfolio?

- Process optimization: 61%
- Predictive asset management: 43%
- Greater plant automation: 41%
- Cyber security & data security: 32%
- Mobile worker solutions: 26%
- IoT, sensors & edge computing: 25%

Global (N=145) Responses choose all that apply – do not add up to 100%. Top 6 collective responses shown.

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TREND 3

Resistance to digital adoption is rising, forcing a greater focus on people priorities

Assessing the impact of digital change on people and the organization is fundamental to driving the adoption of new technologies and reaping their full benefit.
Resistance to digital adoption is rising, forcing a greater focus on people priorities

The Reality

Cost concerns around digital have fallen for the first time in three years.

However, resistance to digital adoption is increasing, with concerns over organizational and cultural issues growing to 48% in 2019, up from 33% in 2018.

Analysis

For the last three years, refiners have reported that demonstrating a clear value proposition for digital is a challenge.

As they move from proof-of-concept to scaling, the focus is on people priorities and governance.

Here, digital role definition and prioritising investment are progressing faster than training and change management.

The Opportunity

Refiners need to become more focused on organizational issues relating to wider digital adoption.

Clarity of ownership of the digital agenda is now critical to drive focus and pace, with a clear tie to the business strategy.

To achieve the last mile of creating value from digital, there is an increased need for an intentional management effort to address the broader impact of digital change on people and the organization.
TREND 3

Resistance to digital adoption is rising, forcing a greater focus on people priorities

Which barriers, if any, prevent successful adoption of digital technologies in your organization?

- Lack of a clear strategy & business value relating to digital
  - 2017: 49%
  - 2018: 50%
  - 2019: 50%

- Resistance to adopt digital solutions (e.g., organizational culture)
  - 2017: 48%
  - 2018: 33%
  - 2019: 24%

- Cost of digital deployment
  - 2017: 46%
  - 2018: 50%
  - 2019: 50%

Responses choose all that apply - do not add up to 100%. Top three responses shown.

Refiners have established top-down governance to drive digital, but indicate slower progress in training and change management at the front line.

Specific Roles/Responsibilities
Change Management
Proactive Investment Prioritization
Training
Maturity reality check: Digital is hard to scale

Refiners are in danger of trapping digital value through an inability to better scale digital
Maturity reality check: digital is hard to scale

**THE REALITY**

A slightly lower percentage of refiners categorized themselves as mature or semi-mature in digital compared to last year.

Production planning, engineering/capital projects and enterprise functions are in focus to mature first to drive digital value.

Refiners are primarily addressing the convergence of IT and OT through an emphasis on the role of IT in their operations as well as creating new organizational structures/models.

**ANALYSIS**

As they start to understand the realities of scaling digital, refiners are finding that they are more digitally immature than they previously thought.

Data integrity, digital infrastructure, connectivity, security and organizational changes are just some of the challenges becoming more acute as companies move from digital concepts to operational reality.

Refiners are addressing this new reality by starting to improve IT and OT alignment. This should help lead to faster scaling and better management of digital projects.

**THE OPPORTUNITY**

Digital offers the potential for refiners to release trapped value in their operating models, which largely remain siloed.

Increased data transparency and access combined with greater systems integration should enable end-to-end value chain optimization.

The ultimate goal of digital transformation should be to increase visibility and allow real-time insights across the entire downstream organization.
**TREND 4**

**Maturity reality check: digital is hard to scale**

How mature would you rate the use of digital technologies overall within your refining operation? Please select the answer that most applies.

- Mature
- Semi-mature
- Aspirational
- Localized
- Novice
- Just getting started
- Don’t know

How is your organization addressing the convergence of information technology and operational systems, (i.e., manufacturing execution systems) for your refining operations?

- Changing role of IT
- Creating new organizational structures/models
- All of the above*

Global (N=145)

Responses add up to 100%. All responses shown.

Responses choose all that apply - do not add up to 100%. Top three responses shown only.

*All of the above includes: Creating new organizational, structures/models; Changing the role of IT; Creating a steering committee; Creating a new C-level position.

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TREND 5

Refiners are seeking partners to better support their digital journeys

Success in digital requires a new, broad ecosystem of partnerships for both pace and scale
TREND 5 Explained

Refiners are seeking partners to support their digital journeys

THE REALITY

72% of refiners reported that they are relatively satisfied with the outcome of their digital investment but only 17% are extremely satisfied.

To increase the impact, over 50% of refiners reported that they plan to outsource, use a large IT provider, and/or use a niche vendor for new digital investment.

ANALYSIS

Refiners are looking to create more value and improve satisfaction from their digital investments.

While some will continue to drive their digital investments in-house, the majority are planning for outside support and partnerships.

THE OPPORTUNITY

Those seeing digital work best are likely to be continuously innovating, testing and scaling digital technologies for maximum value.

These refiners are looking for "value at pace" by leveraging a broad ecosystem of partners to create a technology blueprint which is both agile and evergreen.

As the digital future unfolds, such an ecosystem will allow them to both access specialized skills and make informed decisions faster and more cost effectively.

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Refiners are seeking partners to support their digital journeys

How satisfied is your company/organization with the outcome of digital investment in your production/manufacturing operations over the past year?

- Extremely satisfied: 17% (2018), 17% (2019)
- Relatively satisfied: 71% (2018), 73% (2019)
- Not satisfied: 11% (2018), 8% (2019)
- Not at all satisfied: 1% (2018), 2% (2019)

How does your refinery primarily plan to carry out any new investment in digital for refining?

- Outsourced: 28%
- In-house: 25%
- Via a large IT service provider: 15%
- Via a niche vendor: 10%
- Other: 4%
- Don’t know: 18%

Global (N=145)  Responses add up to 100%. All responses shown.
Conclusion: Refiners should look at the last mile of their digital transformation journeys

Key takeaways from the survey:

• Refiners are realizing some value from digital for key processes
• Digital is here to stay, and investment will continue
• Refiners are experiencing a digital maturity reality check
• Digital transformations remain complex and hard to scale

• Refiners struggle with the last mile of digital transformation — organizational barriers around people and culture, and IT/OT convergence are causing complexity
• People changes are fundamental to transformation efforts to drive the adoption of new technologies
• Success in digital requires a new, broad ecosystem of partnerships for both pace and scale
Contact us to learn more

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The 2019 survey was conducted on behalf of Accenture by OGJ Research in partnership with the Oil and Gas Journal. Respondents are subscribers to PennWell publications and comprise 145 refining industry professionals across 17 countries, including executive and mid-level management, business unit heads, engineers and project managers from a cross-section of the industry. The final results and analysis were supported by Accenture Research.