What will TIC be when it grows up?

Market and technology challenges in the global TIC market, today and tomorrow

Presentation by Bennet Summers, Vivek Madan, OC&C

ACIL Conference, 3 October 2017
In the room today

Wide ranging experience in TIC with industry participants...

... and investors
OC&C is a global strategy consulting firm, bringing clear thinking to the most complex issues

OC&C’s Global Reach

OC&C’s success has translated into consistent growth for our business

- Founded in 1987
- 14 offices worldwide, more than 75 partners and counting...
- Global coverage through our hubs
- Our client roster includes some of the largest corporations and most innovative challengers in the world
Key Messages

Wall Street 01
TIC has rapidly evolved from an asset class to a real industry with increasingly sophisticated participants

Mighty Ducks 02
Bigger is not necessarily better: Leaders deploy a customer-centric winning formula

Attack of the Drones 03
Digital technology has the potential to transform the industry – nobody is immune

Back to the Future 04
Leading players are already developing the capabilities to win in their sector’s ‘end game’
What is TIC? As an industry it has been defined more by investment characteristics than customer needs

### Capabilities
- **Lab-based testing**
  - Chemical / Biological Tests
  - Destructive Materials Testing
  - Non-Destructive Testing
  - Product Qualification
- **Inspection**
  - Supply chain (pre-shipment)
  - Fixed asset inspection / verification
- **Certification**
  - Accredited and Non-Accredited
- **And if you stretch definition…**
  - Assurance (“ATIC”)
  - Consulting (“TICC”)
  - Compliance (“TICC” again)

### Investment Characteristics
- **Delivery Economics**
  - High Margin, Low Capital Intensity
  - Strong Revenue Visibility
- **Customer Behaviour**
  - High cost of failure vs low cost of test
  - Sticky, loyal customers
  - Outsourcing more, to fewer providers
- **Market Tailwinds**
  - Product complexity, faster R&D cycles
  - Increasing Regulation
  - Resilience to Cyclicality
- **Competitive Environment**
  - Fragmented Competition
  - Barriers to Entry

### Customers
- **Any Industry**
- **Anywhere**
TIC has evolved rapidly from an asset class to an industry with increasingly sophisticated participants

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Demand</th>
<th>Supply</th>
<th>Investors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Under the Radar</strong> (pre-2000)</td>
<td>• Strong regulatory framework</td>
<td>• Benign market tailwinds</td>
<td>• Uninterested</td>
</tr>
<tr>
<td><strong>Race to Scale</strong> (2000s)</td>
<td>• In-house, often in a conglomerate</td>
<td>• Buy and build race accelerates</td>
<td>• Early adopters</td>
</tr>
<tr>
<td></td>
<td>• Highly fragmented technically-biased hobbyists</td>
<td>• (Mindless) focus on growth &amp; footprint</td>
<td>• Corporate finance logic</td>
</tr>
<tr>
<td></td>
<td>• Regional plays outside Big 3</td>
<td>• Diversification a virtue</td>
<td>• Industry heretics shunned</td>
</tr>
<tr>
<td><strong>Rumblings in the Provinces</strong> (2013-16)</td>
<td>• Sector collapses</td>
<td>• Buy and build race decelerates</td>
<td>• Blame game</td>
</tr>
<tr>
<td></td>
<td>• Customer frustration</td>
<td>• Integration a pipedream for many</td>
<td>• Ubiquitous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Commercial best practice recognised, if not acted upon</td>
<td>• Heretics embraced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sector focus a virtue</td>
<td>• Discernment</td>
</tr>
<tr>
<td><strong>B2B Business as Usual</strong> (2016-...)</td>
<td>• Increasing customer discernment</td>
<td></td>
<td>• Wise Counsel (after the fact)</td>
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<td></td>
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<td></td>
<td>• Forced to gamble big / getting impatient</td>
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</table>

*Increasing focus on organic growth vs M&A*
Over and above simply doing better, current winners will need to meet well documented market challenges

| Growth Vector Discontinuities | • Volumetric growth in doubt in some sectors  
|                               | • More services (and more competitors) |
| Low Hanging Fruit – Gone      | • Fewer cheap businesses worth buying…  
|                               | • … vendors better informed, more sale options |
| TIC 2.0 (or 3.0, or 4.0…)     | • New demand pools vs substitution of existing demand  
|                               | • Automation, and disruption of traditional service models |

**Value Chain Consolidation**
- Customers getting larger and more powerful (directly and indirectly)
- Increasing price discovery

- Customers demanding more, often for less
- Increasing customer expectations

- China increasingly important as a customer and a participant
- Demand shifts to Latin American (eg Auto)

- Volumetric growth in doubt in some sectors
- More services (and more competitors)

- Fewer cheap businesses worth buying…
- … vendors better informed, more sale options

- New demand pools vs substitution of existing demand
- Automation, and disruption of traditional service models

- “This is the 3rd time in the last year that one of my clients has bought another one”
- “I want advice on what the right test to perform is (but I’m not prepared to pay for it)”
- “Long-term fundamentals in oil & gas are strong, but it’s still tough out there today”
- “Chinese government labs would be a top 10 TIC player in their own right”
- “Price expectations are crazy … every process has a hundred bidders”
- “TIC players are sitting on a mountain of data… but what to do with it?”
Mighty Ducks
Section 02
There is a wide variety of sizes and shapes of TIC players, not just ‘Tier 1’ and below.

OC&C proprietary database of global TIC players – first insight published in 2015

Rockwood

Local Champions (Revenue <$1bn)

International Challengers (Revenue <$1bn)

Global Industry Service Co’s (Revenue >$100m)

Niche Specialists (Revenue $30-100m)

‘Long Tail’ (Revenue <$30m)

Diversified Global Majors (Revenue >$1bn)

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Bigger no longer means better – the best performing players demonstrate customer focus and innovation

<table>
<thead>
<tr>
<th>Category</th>
<th>Example Company</th>
<th>Key Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace</td>
<td>Element</td>
<td>Global market share gain of c.9%pts 2011-2016</td>
</tr>
<tr>
<td>Oil &amp; Gas</td>
<td>AmSpec</td>
<td>18% organic Sales growth in a struggling end market</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>Eurofins</td>
<td>P/E Ratio &gt;30% Share price +6% after EAG acquisition</td>
</tr>
<tr>
<td>Environmental</td>
<td>Pace Analytical</td>
<td>Outperformed top 10 players by c.7% 2013-2016</td>
</tr>
<tr>
<td>Consumer Goods</td>
<td>Al</td>
<td>10-20% organic growth pa vs ‘Big 3’ stagnating</td>
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</tbody>
</table>
The competitive environment is intensifying, with some unorthodox new entrants...

MRO / Asset Management
(Maintenance, Repair, & Operation)

Instrumentation

Consulting

GRC
(Governance, Risk, & Compliance)

Assurance
(Supply Chain Integrity)

Engineering / ESO
(incl R&D Outsourcing)
... and the winning formula has evolved

Growth Levers for Leading TIC Players

1. **Buy & Build**
   - **“Expand the footprint”**
     - ‘Anything, Anywhere’
       - Roll-up acquisitions of ‘tail’ players / labs
       - Diversification across sectors
       - Increasing geographic exposure

2. **Optimise Existing Portfolio**
   - **“Make the most of the footprint”**
     - ‘Sweat the Asset’
       - Asset Utilisation
       - Operational leverage of (thin) centre

3. **Reinvent**
   - **“Take the next step”**
     - Occasional customer-led propositions developed to tell a good investor story

**Old Story**

**New Story**

‘Focus on Footprint’
- Targeted acquisitions to build scale in sectors and expand capability range for customers
- Acquisition of customer operations (outsourcing)
- JVs with customers in new territories / test areas

‘Commercial Excellence’
- Operation excellence (within and across labs) as means to enhance customer service, eg turnaround time
- Key account management
- Pricing and yield management
- Talent management and technical development

‘Customer Centricity’
- Leverage capabilities into adjacent markets
- Evolve delivery model for customers
- Buy or build new capabilities

= Main Source of Value
Attack of The Drones

Section 03
Digital really is a thing

- **Cost of Data Storage**: Down 99% since 2000
- **Amount of Data Stored**: x7 since 2010 globally
- **Adoption of Connected Devices**: x6 since 2010 globally
- **Growth of IoT**: 32bn of Connectable Things by 2020 vs. 13bn in 2013
- **VC Tech Funding**: Up 30% per year in the US since 2010
- **Share of Retail Transactions Online**: 9% globally in 2016, growing at 14% per year
- **Cyber Security**: Over 1 Billion records exposed in almost 8,000 breaches (Ashley Madison, Yahoo, ...)

Source: Gartner, KPCB, IDC, PWC, Statista, ITRC, OC&C analysis
If you think TIC is immune, think again

<table>
<thead>
<tr>
<th>Sector</th>
<th>% Who See Advanced Analytics As Having A Substantial Positive Impact</th>
<th>Advanced Analytics Capability Score (1 low, 10 high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2B Services</td>
<td>33%</td>
<td>5.9</td>
</tr>
<tr>
<td>Retail</td>
<td>26%</td>
<td>4.0</td>
</tr>
<tr>
<td>Leisure</td>
<td>19%</td>
<td>3.9</td>
</tr>
<tr>
<td>TMT</td>
<td>13%</td>
<td>3.8</td>
</tr>
<tr>
<td>FMCG</td>
<td>8%</td>
<td>3.8</td>
</tr>
<tr>
<td>B2B Services</td>
<td></td>
<td>2.7</td>
</tr>
</tbody>
</table>

“In ten years I wouldn’t want to have any lab”

“We want to get into the data loop between OEMs and users”

“We as a corporation face big challenges as frankly we’re technically naive”

“We’re stuck in discussing operational improvements – we want to explore how we can monetise through new offerings”
Digital technology is potentially transformational for both demand and supply

<table>
<thead>
<tr>
<th>Demand</th>
<th>Fulfilment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. New Demand</strong></td>
<td><strong>3. Delivery Economics</strong></td>
</tr>
<tr>
<td>New technologies, such as drones, robotics, and 3D printers, require new forms of testing. Also, a faster innovation cycle and the need to improve cybersecurity entails a higher testing intensity <em>(eg, crash test drone dummies, Michigan MCity)</em></td>
<td>Process automation, intelligent workflow, use of data analytics to accelerate result generation – improves TAT and can transform economics of delivery <em>(eg, robotics in mycotoxin testing)</em></td>
</tr>
</tbody>
</table>

| **2. Substitution** | **4. New Entrants** |
| Tests may be avoided altogether through built-in sensors, or replaced by software *(eg, virtual prototype testing, building sensors)* | A more crowded landscape with MROs, Engineers, and platform providers encroaching on the traditional TIC landscape *(eg, Building In One Platform, Inspectorio)* |

| **5. New Propositions** |
| Stitching together combinations of services – and software & analytics – to deliver superior insight and outcomes for customers *(eg, Asset Integrity Management, R&D Outsourcing)* |

**Impact on TIC Players**

- Positive
- Negative
- Jury's Out

Source: TIC Industry Expert Interviews, OC&C Experience
These trends are still evident today – despite some players being in denial about the changing tides

**The disruptors…**

1. New Demand
   - Ceramics already old news
   - Additive manufacturing growing rapidly

2. Substitution
   - The Jaguar XE saloon was produced without using any prototypes during the aerodynamic engineering process

3. Delivery Economics
   - Asia Inspection disrupted an industry that the Big 3 thought they had sewn up, annihilating barriers to entry through innovation

4. New Entrants
   - Broker models in more commoditised testing – eg, Building in One platform

**… and the to-be-disrupted**

- Swathes of regulation and associated compliance to be worked out for autonomous transport – few TIC providers ready, some in denial

- In contrast, General Motors built about 170 prototypes and drove a million miles during the test phase for its 2013 Chevrolet Malibu saloon

- System certification (ISO) often a very manual, commoditised service, neglected by major players

- Incumbent providers often naïve to the potential challengers – cf ‘Big 3’ in consumer inspection
Back to the Future
Section 04
The end game will depend on where you play, and the customer needs you are addressing…

<table>
<thead>
<tr>
<th>Proposition</th>
<th>Where?</th>
<th>Who?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry Utility</strong></td>
<td>‘Last man standing’ scale provider (or broker?) of highly routine mandatory testing</td>
<td>Environmental</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infrastructure</td>
</tr>
<tr>
<td><strong>Asset Lifecycle Management</strong></td>
<td>Manage asset availability and cost through inspection and maintenance operations</td>
<td>Industrials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil &amp; Gas</td>
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<tr>
<td></td>
<td></td>
<td>Auto / Aero Fleets</td>
</tr>
<tr>
<td><strong>Supply Chain QC</strong></td>
<td>Manage – and reduce – risk across supply chain for OEMs</td>
<td>Automotive Production</td>
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<td></td>
<td></td>
<td>Consumer Goods</td>
</tr>
<tr>
<td><strong>R&amp;D Outsourcing</strong></td>
<td>Outsource entire R&amp;D (or at least the ‘D’) to accelerate cycle</td>
<td>Life Sciences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automotive R&amp;D</td>
</tr>
<tr>
<td>‘The Factory’</td>
<td>Outsourced Manufacturing (subcontracting as required)</td>
<td>New technologies (eg, autonomous vehicles)</td>
</tr>
</tbody>
</table>
... and we can already see examples of this today

<table>
<thead>
<tr>
<th>How?</th>
<th>Who?</th>
<th>What?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build In-House</td>
<td><img src="DNV-GL.png" alt="DNV-GL" /></td>
<td><strong>Total Risk Management</strong> • DNV risk management advisory services for Oil &amp; Gas sector</td>
</tr>
<tr>
<td></td>
<td><img src="LGC.png" alt="LGC" /></td>
<td><strong>Process Optimisation</strong> • Innovation within DNA testing tech (ParaDNA) allows real-time targeting of investigative efforts</td>
</tr>
<tr>
<td>Buy</td>
<td><img src="Intertek.png" alt="Intertek" /></td>
<td><strong>Asset Life Management</strong> • Acquired Aptech in 2009 to form AIM division (Asset Integrity Management)</td>
</tr>
<tr>
<td></td>
<td><img src="eurofins.png" alt="eurofins" /></td>
<td><strong>R&amp;D Lifecycle Management</strong> • Acquired DDS BioAnalytics (a CRO) from Merck (Jan 2014)</td>
</tr>
<tr>
<td>Partner</td>
<td><img src="RICARDO.png" alt="RICARDO" /></td>
<td><strong>ESO/TIC Partnerships</strong> • Ricardo have divested their testing capabilities, and are instead looking to partner with TIC specialists when bidding for work</td>
</tr>
<tr>
<td></td>
<td><img src="Millbrook.png" alt="Millbrook" /></td>
<td>• Similarly, Millbrook regularly partner with ESOs to jointly bid on work</td>
</tr>
</tbody>
</table>

• ‘Conventional’ TIC players need to evolve their propositions, and they have a range of options for doing this…

• … or risk being disintermediated by those who do
### Key Messages

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| Attack of the Drones 03 | Digital technology has the potential to transform the industry – nobody is immune |
| Back to the Future 04 | Leading players are already developing the capabilities to win in their sector’s ‘end game’ |
Any Questions?
Thank you!