Leveraging the Cash to Cash Cycle in Supply Chain Planning

By

Mark Chockalingam, Ph.D.

Fox River Chicago APICS

October 2014
Abstract

- The cash to cash cycle is a traditional supply chain evaluation of how quickly and efficiently the company is operating its supply chain - from putting cash into its operations, buying materials, converting them into a saleable good or service, making the sale and finally collecting the receivables.
  - Companies that operate with a shorter C-to-C cycle should typically be more profitable and operationally efficient.
  - Companies that have a longer C-to-C cycle typically are characterized by poor demand planning, inferior product and service offerings, and also suffer from last minute sales drives and incentives that result in a margin squeeze.

This presentation will focus on new research that shows the impact of C-to-C cycle on business profitability.
Module Outline

- The Cycle of Cash
- The Stockholder Value Model
- Research Scope
- Research findings (WIP)
- Specific Industry comparisons
The Cash to Cash Cycle
The Cycle of Cash

- CASH
- PROCUREMENT
- RECEIVABLES
- PAYABLES
- INVENTORY
The Cash to Cash Cycle =

Days of Inventory +

Days of Receivables –

Days of Payables

Generally the C-2-C is a positive number but there are exceptions such as Apple Inc.

- Negative number implies your suppliers are financing your Day-to-day operations
- Customers are perhaps paying in advance
### Cash to Cash cycle

1. **Inventory turnover ratio**
   \[
   \text{Inventory turnover ratio} = \frac{11,184}{2,594} = 4.31
   \]

2. **Days Sales Outstanding**
   \[
   \text{Days Sales Outstanding} = \left( \frac{365 \times 3,942}{14,414} \right) = 100
   \]

3. **Inventory Days (Days on Hand)**
   \[
   \text{Inventory Days} = \left( \frac{365}{4.31} \right) = 85
   \]

4. **Days Payable Outstanding**
   \[
   \text{Days Payable Outstanding} = \left( \frac{365 \times 1,496}{11,184} \right) = 49
   \]

5. **Cash to cash cycle**
   \[
   \text{Cash to cash cycle} = \left( \text{Days Sales Outstanding} + \text{Days on Hand} - \text{Days Payable Outstanding} \right)
   = (100 + 85 - 49) = 136
   \]
Where is the beef?

➤ It is good to have a smaller C-2-C cycle. But why do we care?
  • Does it improve the Gross Margins?
  • How about Net Margins?
  • Will it generate a better Return on Investment?

➤ Where do we see the benefit from shortening the C-2-C cycle?
The Stock Holder Value Model

**INVESTORS**

- Share Price

**OPERATIONS**

- Return on Assets
  - Earnings (Revenue minus Expenses)
  - Assets
  - Working Capital
**Sample Balance Sheet**

**Assets:**
- Current Assets: $8,707.00
- Non-Current Assets: $14,279.00
- Total Assets: $22,986.00

**Liabilities:**
- Current Liabilities: $3,139.00
- LT Debt & Other LT Liab.: $5,747.00
- Stockholder’s Equity: $14,100.00
- Total Liab. and Equity: $22,986.00
### Sample Income Statement

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$14,414.00</td>
</tr>
<tr>
<td>Costs of Goods (Sales &amp; Services)</td>
<td>-$11,184.00</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>$3,230.00</td>
</tr>
<tr>
<td>Selling/General/Admin. Expenses, Total</td>
<td>-$1,250.00</td>
</tr>
<tr>
<td>Other</td>
<td>-$698.00</td>
</tr>
<tr>
<td>EBIT</td>
<td>$1,282.00</td>
</tr>
<tr>
<td>Interest</td>
<td>-$0.00</td>
</tr>
<tr>
<td>EBT</td>
<td>$1,282.00</td>
</tr>
<tr>
<td>Income Taxes</td>
<td>-$470.00</td>
</tr>
<tr>
<td>Net Income (EAT)</td>
<td>$812.00</td>
</tr>
</tbody>
</table>

- **EBIT** = Earnings before Interest and Taxes
- **EAT** = Earnings after Taxes

\[ \text{EBIT} = \text{EBIT} \]
Profitability Measures

Return on Assets (ROA):

\[
ROA := \frac{\text{Net Income}}{\text{Total Assets}} = \frac{$812.00}{\$22,986.00} = 3.53\%
\]
What drives Profitability

Total firm profitability is influenced by

- Activity (Higher Sales/Jobs)
- Margins (Pricing and profits)
- Efficient Use of Capital and
- Efficient Use of operational Assets such as inventory
  (Resource Deployment)

Operational Performance is divided into

- Gross Margin and Net Margin (How profitable we are)
- Inventory Turns and Asset Turns (How efficient we are)
Using data from approximately 800 companies over the last seven years, we studied the C-2-C cycle and its impact on profitability measures:

• Excluded the Service and Retail industries
• Excluded Energy and Utility companies
• Sorted by Sales and included only companies that had sales of more than $1B
Summary Findings

- The C-2-C cycle did NOT seem to have a material effect on Gross Margins.
- Contrary to intuition, the C-2-C cycle did not seem to affect the Net Margins in a statistically significant way.

However, companies with a longer cash to cash cycle seemed to suffer the largest margin erosion

- These companies lost most of their Gross Margin because of lack of operational efficiency
  - Interest Costs
  - Obsolescence
  - Other Administrative and Handling Costs

- In general, Companies with larger C-2-C cycles exhibited the most margin erosion measured as the difference between Gross Margin – Net Margin or Gross Profit – EBT

- In summary, when a company reduces the C-2-C cycle significantly, they are able to add more of their Gross Margins to their bottom-line. However, this result is weak if the C-2-C reduction comes mainly due to Accounts Payable.
## Industry Analysis for 2013

<table>
<thead>
<tr>
<th>In Millions of USD (except for per share items)</th>
<th>Baker Hughes</th>
<th>Halliburton Company</th>
<th>SLB</th>
<th>Oilwell Varco</th>
<th>Weatherford Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>As of 2013-12-31</td>
<td>As of 2013-12-31</td>
<td>As of 2013-12-31</td>
<td>As of 2013-12-31</td>
<td>As of 2013-12-31</td>
<td>As of 2013-12-31</td>
</tr>
<tr>
<td>Cost of Revenue, Total</td>
<td>$18,553</td>
<td>$24,931</td>
<td>$35,331</td>
<td>$17,380</td>
<td>$12,302</td>
</tr>
<tr>
<td>Total Inventory</td>
<td>$3,884</td>
<td>$3,305</td>
<td>$4,603</td>
<td>$5,603</td>
<td>$3,371</td>
</tr>
<tr>
<td>Inventory Turnover Ratio</td>
<td>4.78</td>
<td>7.54</td>
<td>7.68</td>
<td>3.10</td>
<td>3.65</td>
</tr>
<tr>
<td>Inventory Days (Days on hand)</td>
<td>75</td>
<td>48</td>
<td>47</td>
<td>116</td>
<td>99</td>
</tr>
<tr>
<td>Account Receivables</td>
<td>$5,138</td>
<td>$6,181</td>
<td>$11,497</td>
<td>$4,896</td>
<td>$3,594</td>
</tr>
<tr>
<td>Net Income after taxes</td>
<td>$1,096</td>
<td>$2,125</td>
<td>$6,732</td>
<td>$2,327</td>
<td>$(345)</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$22,364</td>
<td>$29,402</td>
<td>$46,459</td>
<td>$22,869</td>
<td>$15,263</td>
</tr>
<tr>
<td>Days Sales Outstanding</td>
<td>83</td>
<td>76</td>
<td>89</td>
<td>77</td>
<td>85</td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>$2,574</td>
<td>$2,365</td>
<td>$8,821</td>
<td>$1,275</td>
<td>$2,091</td>
</tr>
<tr>
<td>Days Payable Outstanding</td>
<td>50</td>
<td>34</td>
<td>90</td>
<td>26</td>
<td>61</td>
</tr>
<tr>
<td><strong>Cash to Cash Cycle in Days</strong></td>
<td><strong>108</strong></td>
<td><strong>89</strong></td>
<td><strong>46</strong></td>
<td><strong>167</strong></td>
<td><strong>122</strong></td>
</tr>
<tr>
<td>Gross Margin</td>
<td>17.04%</td>
<td>15.21%</td>
<td>23.95%</td>
<td>24.00%</td>
<td>19.40%</td>
</tr>
<tr>
<td>Net Margin</td>
<td>4.90%</td>
<td>7.23%</td>
<td>14.49%</td>
<td>10.18%</td>
<td>-2.26%</td>
</tr>
<tr>
<td>Gross Margin - Net Margin</td>
<td>12.14%</td>
<td>7.98%</td>
<td>9.46%</td>
<td>13.83%</td>
<td>21.66%</td>
</tr>
</tbody>
</table>
## Industry Analysis for average of last four years

<table>
<thead>
<tr>
<th>In Millions of USD (except for per share items)</th>
<th>Baker Hughes</th>
<th>Halliburton Company</th>
<th>SLB</th>
<th>Oilwell Varco</th>
<th>Weatherford Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg of 2010-13</td>
<td>Avg of 2010-13</td>
<td>Avg of 2010-13</td>
<td>Avg of 2010-13</td>
<td>Avg of 2010-13</td>
<td></td>
</tr>
<tr>
<td>Cost of Revenue, Total</td>
<td>$15,589</td>
<td>$20,887</td>
<td>$29,529</td>
<td>$12,642</td>
<td>$10,356</td>
</tr>
<tr>
<td>Total Inventory</td>
<td>$3,370</td>
<td>$2,750</td>
<td>$4,473</td>
<td>$4,728</td>
<td>$3,199</td>
</tr>
<tr>
<td>Inventory Turnover Ratio</td>
<td>4.63</td>
<td>7.59</td>
<td>6.60</td>
<td>2.67</td>
<td>3.24</td>
</tr>
<tr>
<td>Inventory Days (Days on hand)</td>
<td>78</td>
<td>47</td>
<td>55</td>
<td>135</td>
<td>111</td>
</tr>
<tr>
<td>Account Receivables</td>
<td>$4,693</td>
<td>$5,244</td>
<td>$10,157</td>
<td>$3,733</td>
<td>$3,335</td>
</tr>
<tr>
<td>Net Income after taxes</td>
<td>$1,240</td>
<td>$2,359</td>
<td>$5,372</td>
<td>$2,120</td>
<td>($288)</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$19,493</td>
<td>$25,177</td>
<td>$38,307</td>
<td>$17,431</td>
<td>$13,422</td>
</tr>
<tr>
<td>Days Sales Outstanding</td>
<td>87</td>
<td>75</td>
<td>95</td>
<td>77</td>
<td>89</td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>$1,904</td>
<td>$1,843</td>
<td>$4,602</td>
<td>$1,001</td>
<td>$1,776</td>
</tr>
<tr>
<td>Days Payable Outstanding</td>
<td>44</td>
<td>32</td>
<td>56</td>
<td>29</td>
<td>62</td>
</tr>
<tr>
<td><strong>Cash to Cash Cycle in Days</strong></td>
<td><strong>121</strong></td>
<td><strong>91</strong></td>
<td><strong>94</strong></td>
<td><strong>183</strong></td>
<td><strong>139</strong></td>
</tr>
<tr>
<td>Gross Margin</td>
<td>20.31%</td>
<td>17.25%</td>
<td>23.02%</td>
<td>28.21%</td>
<td>23.18%</td>
</tr>
<tr>
<td>Net Margin</td>
<td>6.36%</td>
<td>9.53%</td>
<td>14.09%</td>
<td>12.48%</td>
<td>-2.01%</td>
</tr>
<tr>
<td>Gross Margin - Net Margin</td>
<td>13.95%</td>
<td>7.72%</td>
<td>8.93%</td>
<td>15.73%</td>
<td>25.19%</td>
</tr>
</tbody>
</table>
# Industry Analysis for 2013

<table>
<thead>
<tr>
<th>In Millions of USD (except for per share items)</th>
<th>Dell 2013</th>
<th>HP 2013</th>
<th>Apple 2013</th>
<th>IBM 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Revenue, Total</td>
<td>$44,754</td>
<td>$86,380</td>
<td>$106,606</td>
<td>$51,246</td>
</tr>
<tr>
<td>Total Inventory</td>
<td>$1,382</td>
<td>$6,046</td>
<td>$1,764</td>
<td>$2,310</td>
</tr>
<tr>
<td>Inventory Turnover Ratio</td>
<td>32.38</td>
<td>14.29</td>
<td>60.43</td>
<td>22.18</td>
</tr>
<tr>
<td>Inventory Days (Days on hand)</td>
<td>11</td>
<td>25</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Account Receivables</td>
<td>$6,629</td>
<td>$24,024</td>
<td>$20,641</td>
<td>$31,836</td>
</tr>
<tr>
<td>Net Income after taxes</td>
<td>$2,372</td>
<td>$5,113</td>
<td>$37,037</td>
<td>$16,483</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$56,940</td>
<td>$112,298</td>
<td>$170,910</td>
<td>$99,751</td>
</tr>
<tr>
<td>Days Sales Outstanding</td>
<td>42</td>
<td>77</td>
<td>43</td>
<td>115</td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>$11,579</td>
<td>$14,019</td>
<td>$22,367</td>
<td>$7,461</td>
</tr>
<tr>
<td>Days Payable Outstanding</td>
<td>93</td>
<td>58</td>
<td>76</td>
<td>52</td>
</tr>
<tr>
<td><strong>Cash to Cash Cycle in Days</strong></td>
<td>-40</td>
<td>44</td>
<td>-26</td>
<td>79</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>21.52%</td>
<td>23.08%</td>
<td>38%</td>
<td>49%</td>
</tr>
<tr>
<td>Net Margin</td>
<td>4.17%</td>
<td>4.55%</td>
<td>27%</td>
<td>16.52%</td>
</tr>
<tr>
<td>Gross Margin - Net Margin</td>
<td>17.35%</td>
<td>18.53%</td>
<td>10.96%</td>
<td>32.10%</td>
</tr>
</tbody>
</table>
Cash to cash cycle over four years
C2C Vs. Margin Compression
Alcoholic Beverages

7 (Consumer Non-Cyclical) Alcoholic Beverage companies in the sample
Days of Inventory Vs. Margin Compression

7 (Consumer Non-Cyclical) Alcoholic Beverage companies in the sample
C2C Vs. Margin Compression

Major Drugs

7 Healthcare (Major Drugs) companies in the sample
Days of Inventory Vs. Margin Compression

7 Healthcare (Major Drugs) companies in the sample
ABOUT US

➢ Who is the author?
➢ What is Demand Planning LLC?
➢ Who are Demand Planning LLC clients?
➢ How can you contact the author of this paper?
About The Author

Dr. Mark Chockalingam is Founder and President, Demand Planning LLC, a Business Process and Strategy Consultancy firm. He has conducted numerous training and strategy facilitation workshops in the US and abroad, and has worked with a variety of clients from Fortune 500 companies such as Wyeth, Miller SAB, FMC, Teva to small and medium size companies such as Au Bon pain, Multy Industries, Ticona- a division of Celanese AG.

Prior to establishing his consulting practice, Mark has held important supply chain positions with several manufacturing companies. He was Director of Market Analysis and Demand Planning for the Gillette Company (now part of P&G), and prior to that he led the Sun care, Foot care and OTC forecasting processes for Schering-Plough Consumer HealthCare.

Mark has a Ph. D. in Finance from Arizona State University, an MBA from the University of Toledo and is a member of the Institute of Chartered Accountants of India.
Demand Planning LLC is a consulting boutique comprised of seasoned experts with real-world supply chain experience and subject-matter expertise in demand forecasting, S&OP, Customer planning, and supply chain strategy.

We provide process and strategy consulting services to customers across a variety of industries - pharmaceuticals, CPG, High-Tech, Foods and Beverage, Quick Service Restaurants and Utilities.

Through our knowledge portal DemandPlanning.Net, we offer a full menu of training programs through in-person and online courses in Demand Forecast Modeling, S&OP, Industry Forecasting, collaborative Forecasting using POS data.

DemandPlanning.Net also offers a variety of informational articles and downloadable calculation templates, and a unique Demand Planning discussion forum.

Demand Planning LLC has worked with...

- NStar
- Abbott Labs
- Wyeth
- Au Bon Pain
- Teva
- Celanese
- Hill’s Pet Nutrition
- Campbell’s Soups
- Miller Brewing co.
- Texas Instruments
- Hewlett Packard
- World Kitchen
- Lifetime Products

- FMC Lithium
- McCain Foods
- Lnoppen, Shanghai
- North American Breweries
- Pacific Cycles
- Smead
- White Wave foods
- Ross Products
- Fox entertainment
- Limited Brands
- Nomacorc
- F. Schumaker
Contact Us

Mark Chockalingam, Ph.D.
Demand Planning, LLC
26 Henshaw Street,
Woburn, MA 01801

Email: markc@demandplanning.net
Web: www.demandplanning.net

Phone: (781)995-0685