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# **Cash Flow**

# **Critical Equation #9 for Business Leaders**

Cash Flow =  $\triangle$  Cash = Operating, Investing and Financing Activities

"If the Cash Does Not Flow, the Answer is No"

### Overview

There is an old saying, "*If the cash does not flow, the answer is no.*" A cash shortage is among the primary drivers that will lead to bankruptcy. It can easily cause a business to fall behind on payments and reduce its ability to reinvest for growth. This can lead to additional borrowing and the potential for spiral down. Never be fooled by profits, because you can go broke while recording those gains.

The bottom line is very simple: everyone in your organization needs to be aware of cash flow and understand their own impact on it. Cash is everyone's responsibility. If the global financial crisis and its associated liquidity and solvency backdrop has taught us anything, it is that there is truth to the old adage, *"Cash is king."* 

The rationale for holding cash has been the subject of endless debate for decades both in academia and the business world. Justifications range from operating needs (i.e., the cash needed in the "till" to open the doors to business each day) to precautionary needs (rainy days and sailing through economic downturns).

Since the late 2000s, the liquidity need has predominated due to the risk associated with the inability to refinance debt, a risk experienced by even highly rated organizations. This refinancing risk has led many businesses to operate under the premise that you can never have enough cash or that, as the saying goes, excess cash is defined as zero. The *"trapped or stranded overseas"* tax debate rages nonstop and is a very real factor in increasing cash and marketable securities holdings. (Cash-to-assets, which includes marketable securities, has increased from low double digits in the '80s to more than 20 percent today.) Our purpose is not to debate the rationale but to recognize that recent global uncertainty has generated many divergent opinions and strategies around cash holdings.

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Exhibit 1 depicts a business's standard cash cycle (not necessarily exhaustive but representative). If, from this chart, you cannot recognize your position and your impact within the cash cycle, look again or assume your job may be in jeopardy.



The flow of cash, as depicted in Exhibit 1, is the logic behind any business's cash budget. The cash budget, of course, must reflect the timing differences of cash inflows and outflows.

In the sections that follow, we will:

- Present in detail TRI's Critical Equation # 9 on cash flow,
- Provide a cash flow financial statement from Dell, one of the best organizations at generating liquidity on an historical basis,
- Explore the linkage between working capital turns and days,
- · Look at classic cash flow variance walks,
- Provide a qualitative link between six sigma and cash-generating ability,
- See how cash flow is connected to valuation, and
- Bring it back to work throughout.

Finally, we will provide references to our other TRI Critical Equations as appropriate.

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### TRI's Critical Equation #9 – Cash Flow

Our Equation #9, cash flow, is represented by

#### Cash Flow = $\triangle$ Cash = Operating, Investing and Financing Activities

Under Generally Accepted Accounting Principles (GAAP), which is recognized as the standard framework of guidelines for financial accounting, cash flow has three components; operating, investing and financing. That is, cash comes from and/or is consumed in the operating, investing and financing activities of any business. This relationship is often referred to as the indirect approach to calculating cash flow. (The direct method would more closely align to a checking account and is not our primary focus.) We can rewrite our Equation #9 as follows:

### Cash Flow = $\triangle$ Cash = Operating CF + Investing CF + Financing CF

*CF* is cash flow. We can divide our cash flow statement into the primary (not exhaustive) drivers of each of the three components as follows:



It is critical to recognize that negative values can and will exist in this framework. Note that because our first driver is net income, by the indirect method we start with the last item from an income statement to begin determining cash flow. Depreciation, which would have been an expense in arriving at net income, is added back because it is a non-cash expense. (You will recall that working capital was a major component of our prior equations series, in particular in Equation #8 on economic profit. We will be discussing the others below.)

Either the indirect or direct method of cash flow will take us from the beginning cash to the ending cash on a balance sheet. Thus, we can depict our accounting cash flow as tied to our balance sheets in the following manner:

#### Accounting Cash Flow = $\triangle$ Cash = End Cash minus Beg Cash

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The cash flow from a balance sheet perspective starts with Exhibit 2, which includes both a beginning and an ending balance sheet.



Accounting cash flow, as defined above, is ending cash minus beginning cash, and in the framework of Exhibit 2 can be written as:

**RE** is retained earnings; **Dep** is depreciation; and **A/R**, **Inv** and **A/P** are accounts receivable, inventory and accounts payable, respectively. **Debt** is interest-bearing liabilities (current and/or long-term), while **CS** is the common stock. **CS** and **RE** would be components of shareholders' equity. The subscripts **B** and **E** reference the beginning and ending positions, respectively. Note that we use the change in all of the balance sheet items to reconcile cash flow as defined by the difference between ending and beginning cash. We assume no dividends for simplicity, which means that the change in retained earnings is reconciled from the net income. We also, for the time being, ignore a driver of cash flow from a working capital perspective that is commonly referred to as "progress collections" or "advance payments."

We can then summarize the links amongst the preceding relationships in Exhibit 3, as follows:

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#### Exhibit 3



By looking at Exhibit 3 in concert with Exhibit 1, we can find all of the drivers – controllable and uncontrollable -- that enhance cash flow. As is the case with any business decision, care must be taken to balance short- and long-term needs. Any business leader must be keenly aware of this balance of meeting commitments in the short term while investing for growth and competitiveness in the long term. This is annual stress that exists between annual operating budgets and longer term appropriation requests.

#### Cash Flow Example

In this section we look at the financial statements of Dell, Inc., whose make-to-order PC business model has historically led to strong cash generation. Exhibit 4 summarizes for Dell the three areas of cash flow outlined in Exhibit 3.

#### Exhibit 4

|    |                   | Fisca   | d Year Ende   | đ   |  |
|----|-------------------|---|---|---|--|
| Fe | bruary 3,<br>2012 | J   | anuary 28,<br>2011  | J   | anuary 29,<br>2010   |
|    |                   | 6   | n millions)   |   |  |
|    |                   |   |   |   |  |
| \$ | 5,527             | \$  | 3,969   | \$  | 3,906  |
|    | (6,166)           |   | (1,165)   |   | (3,809)  |
|    | 577               |   | 477   |   | 2,012  |
|    | 1                 |   | (3)   |   | 174  |
| \$ | (61)              | \$  | 3,278   | \$  | 2,283  |
|    | 5<br>5            | February 3,<br>2012<br>\$ 5,527<br>(6,166)<br>577<br>1<br>\$ (61) | Fibruary 3,<br>2012 Ji   \$ 5,527 \$   (6,166) \$   \$ 777 1   \$ (61) \$ | Fiscal Year Ende   February 3,<br>2012 January 28,<br>2011<br>(in millions)   \$ 5,527 \$ 3,969<br>(6,166)   (6,166) (1,165)   577 477   1 (3)   \$ (61) \$ 3,278 | Fiscal Year Ended   February 3,<br>2012 January 28,<br>2011<br>(in millions) January 28,<br>2011   \$ 5,527 \$ 3,969 \$<br>(6,166) \$<br>(1,165)   577 477 \$<br>1 (3)   \$ (61) \$ 3,278 \$ |

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Exhibit 5 provides the details behind Exhibit 4 and is a standard statement of cash flows with the aforementioned breakdown into operating, investing and financing activities. Note that it starts, as seen in Exhibit 3, with net income and the add backs for non-cash items such as depreciation and amortization. (There are many accounts relevant to Dell of course, that impact cash but are beyond the scope of our Equation #9 and Exhibit 3.)

#### Exhibit 5

#### DELL INC. CONSOLIDATED STATEMENTS OF CASH FLOWS (in millions)

|   | Fiscal Year Ender |                   | ed | nd                |    |                   |
|---|-------------------|-------------------|----|-------------------|----|-------------------|
|   | Fe                | bruary 3,<br>2012 | Ja | nuary 28,<br>2011 | Ja | nuary 29,<br>2010 |
| Cash flows from operating activities:   |                   |                   | _  |                   | _  |                   |
| Net income  | \$                | 3,492             | \$ | 2,635             | \$ | 1,433             |
| Adjustments to reconcile net income to net cash provided by operating activities:                     |                   |                   |    |                   |    |                   |
| Depreciation and amortization   |                   | 936               |    | 970               |    | 852               |
| Stock-based compensation expense  |                   | 362               |    | 332               |    | 312               |
| Effects of exchange rate changes on monetary assets and liabilities denominated in foreign currencies |                   | (5)               |    | (4)               |    | 59                |
| Deferred income taxes   |                   | 19                |    | (45)              |    | (52)              |
| Provision for doubtful accounts including financing receivables                                       |                   | 234               |    | 382               |    | 429               |
| Other   |                   | 21                |    | 26                |    | 102               |
| Changes in assets and liabilities, net of effects from acquisitions:                                  |                   |                   |    |                   |    |                   |
| Accounts receivable   |                   | (53)              |    | (707)             |    | (660)             |
| Financing receivables   |                   | (372)             |    | (709)             |    | (1,085)           |
| Inventories   |                   | (52)              |    | (248)             |    | (183)             |
| Other assets  |                   | (28)              |    | 516               |    | (225)             |
| Accounts payable  |                   | 327               |    | (151)             |    | 2,833             |
| Deferred services revenue   |                   | 720               |    | 551               |    | 135               |
| Accrued and other liabilities   |                   | (74)              |    | 421               |    | (44)              |
| Change in cash from operating activities  | _                 | 5,527             | _  | 3,969             | _  | 3,906             |
| Cash flows from investing activities:   |                   |                   |    |                   | _  |                   |
| Investments:  |                   |                   |    |                   |    |                   |
| Purchases   |                   | (4,656)           |    | (1,360)           |    | (1,383)           |
| Maturities and sales  |                   | 1,435             |    | 1,358             |    | 1,538             |
| Capital expenditures  |                   | (675)             |    | (444)             |    | (367)             |
| Proceeds from sale of facilities and land   |                   | 14                |    | 18                |    | 16                |
| Purchase of financing receivables   |                   | _                 |    | (430)             |    | _                 |
| Collections on purchased financing receivables  |                   | 278               |    | 69                |    | _                 |
| Acquisitions, net of cash received  |                   | (2,562)           |    | (376)             |    | (3,613)           |
| Change in cash from investing activities  | _                 | (6,166)           | _  | (1,165)           | _  | (3,809)           |
| Cash flows from financing activities:   |                   |                   | _  |                   | _  |                   |
| Repurchases of common stock   |                   | (2,717)           |    | (800)             |    | -                 |
| Issuance of common stock under employee plans   |                   | 40                |    | 12                |    | 2                 |
| Issuance (repayment) of commercial paper (maturity 90 days or less), net                              |                   | 635               |    | (176)             |    | 76                |
| Proceeds from debt  |                   | 4,050             |    | 3,069             |    | 2,058             |
| Repayments of debt  |                   | (1,435)           |    | (1,630)           |    | (122)             |
| Other   |                   | 4                 |    | 2                 |    | (2)               |
| Change in cash from financing activities  | -                 | 577               | _  | 477               | -  | 2,012             |
| Effect of exchange rate changes on cash and cash equivalents  |                   | 1                 |    | (3)               | _  | 174               |
| Change in cash and cash equivalents   | -                 | (61)              | _  | 3,278             | -  | 2,283             |
| Cash and cash equivalents at beginning of the period  |                   | 13.913            |    | 10,635            |    | 8.352             |
| Cash and cash equivalents at end of the period  | \$                | 13,852            | \$ | 13,913            | \$ | 10,635            |

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For Dell, advance payments (referred to as deferred services revenue), are a significant component of cash flow from operating activities. This deferred services revenue is actually a liability because, on a net basis, the service has not been rendered and revenue has not been recognized, but the cash has been collected. Nothing is more cash flow-friendly than advance payments, as discussed in our Equation #8 on economic profit.

### Turnover, Days and Cash Conversion Cycle

In this section we explore the links between turns and days in working capital. These are often referenced and measured as key performance indicators of cash-generating ability.

Exhibit 6 provides a breakdown of working capital into its three primary components: A/R, inventory and A/P. To keep it simple, we have excluded advance payments. The three components are consistent with the discussion in our other TRI Critical Equations.

#### Exhibit 6

# **Turnover and Days in Working Capital**

| Working Capital Account   | Turnover*         | Days In                      |
|---------------------------|-------------------|------------------------------|
| Accounts Receivable (A/R) | Sales<br>A/R      | <u> </u>                     |
| nventory                  | COGS<br>Inventory | 365 Days<br>Inventory Turns  |
| Accounts Payable (A/P)    | COGS<br>A/P       | <u>365 Days</u><br>A/P Turns |

\*Alternative use Net Sales in Numerator of all and/or Purchases in Numerator of A/P Turns

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In Exhibit 7, we introduce the measurement that is often referred to as the Cash Conversion Cycle (CCC). Note its definition in relationship to the days from Exhibit 6 and, in particular, the minus sign associated with days in payables.



An important aspect of the CCC is that it reflects an organization's entire value chain. This makes it hard to forecast correctly because of the need to balance suppy and demand within your value chain. It is the CCC that must be financed, often using asset-based working capital revolvers. The CCC should also demonstrate the areas we should strive to improve.

Exhibit 8 compares data for selected industries and the U.S. economy overall. To appreciate why the statistics can vary significantly amongst segments of our economy, consider the many differences between various industries. For example, in Aerospace and Defense the product is extremely complex, in some cases involving millions of sku's. With a production cycle that is typically very lengthy and supply chains that can involve numerous entities, a significant investment in inventory should come as no surprise.

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#### Exhibit 8

| Industry*               | Working Capital | A/R | Inventory | Payables |
|-------------------------|-----------------|-----|-----------|----------|
| Aerospace & Defense     | 97              | 65  | 54        | 27       |
| Biotechnology           | 80              | 63  | 23        | 16       |
| Computers & Peripherals | 29              | 50  | 20        | 41       |
| Oil & Gas               | 21              | 38  | 10        | 28       |
| Semiconductor           | 72              | 44  | 50        | 27       |
| U.S. Top 1000           | 40              | 38  | 33        | 32       |

### Cash Conversion Cycles Across Industries

\* All values are Days In, Median Values as reported by CFO/REL Working Capital Scorecard 2013

Exhibit 9 demonstrates the CCC at Dell, Inc. Historically, this is a classic negative working capital scenario.

#### Exhibit 9

|  | Fiscal Quarter Ended |                     |                     |  |  |  |  |
|--|----------------------|---------------------|---------------------|--|--|--|--|
|  | February 3,<br>2012  | January 28,<br>2011 | January 29,<br>2010 |  |  |  |  |
| Days of sales outstanding(4)               | 42                   | 40                  | 38                  |  |  |  |  |
| Days of supply in inventory <sup>(b)</sup> | 11                   | 5                   | 8                   |  |  |  |  |
| Days in accounts payable(4)                | (89)                 | (82)                | (82)                |  |  |  |  |
| Cash conversion cycle                      | (36)                 | (33)                | (36)                |  |  |  |  |

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In TRI Critical Equation #2 on the Dupont relationship, we presented a problem that demonstrated a potential disconnect between net income and cash flow in a business. (See Exhibits 5, 6 and 7 of Equation #2.) Exhibit 10 calculates the turns and days for A/R and inventory and provides another perspective of the cash flow issues in the original problem from Equation #2.

#### Exhibit 10

|                                     | - 00   | FIIOFFIO       | biein - |         |                      |  |  |
|-------------------------------------|--------|----------------|---------|---------|----------------------|--|--|
|                                     | Year 1 | Year 2         | Year 3  | %<br>(Y | Change<br>r. 1 to 3) |  |  |
| Sales                               | \$100  | \$140          | \$200   |         | 100%                 |  |  |
| Costs                               | -95    | -126           | -170    |         | 79%                  |  |  |
| Earnings                            | \$5    | \$14           | \$30    |         | 500%                 |  |  |
| Cash                                | \$30   | \$15           | \$2     |         | -93%                 |  |  |
| Receivables                         | 20     | 40             | 50      |         | 200%                 |  |  |
| Inventory                           | 10     | 25             | 48      |         | 380%                 |  |  |
| Plant/Equipment                     | 40     | 45             | 50      |         | 25%                  |  |  |
| Total Assets                        | \$100  | \$125          | \$160   |         | 60%                  |  |  |
|                                     | Year 1 | Ye             | ear 2   | Year 3  | _                    |  |  |
| Asset Turns                         | 1      | ] [1.          | .12     | 1.25    |                      |  |  |
| Receivable Turns                    | 5.00   |                | .50     | 3.33    |                      |  |  |
| nventory Turns*                     | 10.0   | 5              | .6      | 4.17    | _                    |  |  |
| Days in Receivables                 | 73     | ] [1           | 04      | 110     | -                    |  |  |
| Days in Inventory                   | 37     | ] <del>(</del> | 65      | 88      |                      |  |  |
| <sup>•</sup> Use Sales instead of C | cogs   |                |         |         |                      |  |  |
| What are the implications?          |        |                |         |         |                      |  |  |

### **Cash Flow and Turnover**

One of our favorite exercises on cash flow generation with corporate clients is to ask them to calculate the potential positive impact of improving DSO and/or DSI by one day in their business. The results can be dramatic, as Exhibit 11 shows.

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Exhibit 11

## Business Financials\* - The History of Lost Opportunity -



What do we hear and what have we learned from the kind of exercise in Exhibit 11? The answer begins with an understanding of the academic and practitioner literature, which is replete with methods to maximize cash flow, in particular for working capital. The only best practice we can offer that is not industry-specific is to ensure that all of your decisions align with your strategy and the creation of economic value for shareholders, not just with your accounting returns.

Your decision-making must be value chain-oriented and reflect a total understanding of your customer, as well as your customer's customer, and all of the risks associated with your supply chain. Optimal growth requires a continual cross-functional dialogue that integrates your cash management with your short- and long-term business objectives.

The list of action items is daunting. It includes cash calls, proper understanding of estimation of reserves, credit checks and aging, reducing disputed receivables (in particular around billing errors), employing data analysis, e-procurement and auctions, and negotiating with numerous suppliers while having long-term partnerships with only a few, having backups, vertical integration, alliances and JVs, understanding demand variability (which drives forecasting accuracy), lead times, carry costs of inventory (including cost of capital, insurance, quality, obsolescence, shrinkage, storage, etc.), volatility of material costs, better integration of NPIs, reductions in cycle

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time, maximizing impact of positive NPS, adopting a continuous-process mentality, Little's law, impact of trade payables programs that may be available to you, and hedging.

Finally, advance payments is an area of cash management that, over time, can negatively impact long-cycle businesses. While beyond the scope of this article, the growth of the service market economy and contractual service agreements, commonly referred to as CSAs, can have significant risk creep. This can bring us back to the cash-friendly nature of advance payments. When work is performed that gets ahead of cash billings, companies with CSAs can end up with a deferred asset instead of a deferred liability. This can lead to significant risk if the customer defaults. The key is to always stay cash positive.

### Cash Flow and Quality of Earnings

Imagine net income and cash flow being the same. It would seem to simplify life and possible valuation. That is, do I use earnings? Do I use cash? Exhibit 12 shows the net income, operating and investment cash flows found in Exhibit 3, in a rearranged format. The financing cash flow is not part of this relationship. This formulation of cash flow is often referred to as Free Cash Flow (FCF).

Exhibit 12



Net Income = Accounting Free Cash Flow

The FCF shows the amounts of money available to meet financing needs. If it is a negative number, additional debt and/or equity will need to be raised, part of which can be offset by beginning cash. If beginning cash was zero then financing is essential or failure will result.

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The relationship between investment in capital expenditures and depreciation is commonly referred to as the reinvestment ratio. Specifically, the reinvestment ratio is capital expenditure divided by depreciation. There are three scenarios: more than, equal to, or less than 1. For the majority of businesses that have growth potential, that operate in an inflationary environment, and have been around for a long time, this ratio typically exceeds 1 because historical depreciation is not sufficient to find the future. A business whose growth is stagnant may be able, for a while, to not invest and harvest cash simply because depreciation will exceed capital expenditures.

As seen in Exhibit 12, if the cash conversion cycle can be driven to zero we would reach a state of working capital equal to zero and sales growth would not require incremental investment. Of course, this also could be achieved if A/R, inventory and A/P are all zero, but that's a tricky scenario at best. To show how difficult it can be for a manufacturing business to get to working capital equal to zero, assume we could be in a perfect make-to-order (referred to as MTO) environment and drive the DSI to zero. To arrive at working capital equal to zero would require that DSO be the same as DTP. Remember, DSO includes everything, even margin. DTP has a direct linkage to costs, primarily inventory, and is therefore only a component of DSO. In a typical manufacturing business, it would not be uncommon that DTP would have to be a multiple of DSO and DSI.

While it may sound theoretically easy, the potential negative impact on slow pay to suppliers, which is implicit, can easily drive them to the verge of bankruptcy and costly financing options, and certainly would not be consistent with a viable supplier-customer relationship. The other factor is that suppliers will rationally raise price for the implicit cost of money. Recall the discussion on Dell in Exhibit 9 and its negative working capital.

In the scenario in which the reinvestment ratio equaled one and working capital was zero, we would have the unique result that the net income and accounting free cash flow are the same. Many would call this the *"quality of earnings."* In TRI Critical Equation #3, we provided an example of the extreme disconnect that can occur between net income and cash flow. This was also depicted above in Exhibit 10.

#### **Cash Flow Walks**

Visual representations of simple data are very useful in depicting relationships. In TRI Critical Equation #2 on variance analyis, we introduced a financial tool commonly referred to as an operating margin walk. We did this under three linked formats: prior year to plan, plan to actual, and prior year to actual. We know that cash flow forecasts are indeed very rare for publically traded companies to present. It is less uncommon, however, for financial goals around cash flow forecasts to be stated as **"Cash flow greater than or equal to net income."** Numerous companies do use cash flow walks to help decision-makers (internal and external) better understand variations in cash overtime. Exhibit 13 (A, B andC) includes three such real-world examples from Adecco, Pentair and Amazon, respectively.

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Exhibit 13 A

#### Pentair Pro forma Walks 2010 to '14 Operating Income Opportunity 2014 Cash Flow Generation Potential 2 turns of WC \$305N -\$55M \$305M \$140M -\$425M ~\$130M -\$600M of FCF (8.3 pts) +1.6 pts. ~(\$150M) ~\$350M (\$75M ~(\$110M) ~(\$10M) ~(\$245M) ~\$330M R&D = ~\$80M Selling/Mark = ~\$60N 120% of NI 11-11.59 ROS '14 ket Growth: ~\$230M ~15° R05 10 • Mfg = ~\$10M ket/Product 15% 9% (9%) ion: ~\$70M 11% ns: -\$51 Inflation Productivity Strategic Investment 2010 orecas Net Pricing 2014 Estimate 2014 Depr./ Estimated NI Amort./SOE Capita 2014 Estimated FCF Growth Growth + Productivity ... Yields > 15%+ Op Income CAGR 66 Significant Cash Generation Potential; NI + Working Capital 99 95

Exhibit 13 B

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Exhibit 13 C

Note that in all three walks, you can see the basics of our Equation #9: net income, working capital, capex and depreciation. The Adecco example is particularly illustrative because it breaks down the A/R into business and structure. "Business" references the fact that if sales increase, A/R will, holding everything constant, spontaneously increase. "Structures" illustrates that not only did the business grow but the average client took longer to pay (from the increase in DSO). Note that inventory is non-existent in a people-oriented business such as Adecco.

The Pentair proforma walks are an example of combined income statement drivers (such as pricing and productivity, as discussed in TRI Critical Equation #2) and cash flow drivers. The gap between the two charts possibly could reflect interest expense and/or taxes as prime drivers.

The Amazon example is interesting as it shows that in 2003 A/R was essentially zero (because Amazon got paid immediately) but generated excess cash from the number of days the company took to pay suppliers. This bears similarities to Dell in the old MTO environment. In all three cases, the walks only consider operational and investment cash flows (no financial flows). This is properly referred to as Free Cash Flow, which we'll discuss in detail later.

As TRI simulation clients are aware, cash flow walks are an integral part of our standard financial reporting and very useful during operational reviews.

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#### Linkage of Cash Flow, Financial Ratios, and Lean Six Sigma

The example in Exhibit 14 is designed to show how numerous small incremental changes can equate to significant financial improvement. The assumptions lay out the scenario. The basic analysis is centered around cycle time improvement. The two scenarios on cycle time improvement are mutually exclusive in the example.

Exhibit 14



Speed, Quality and Cash Flow

While there is no theoretical structure that we know of to support a direct relationship between financial cash flow and six sigma improvement, there certainly is a fundamental logic of a positive relationship. This example is designed to show a reasonable hypothetical of such a relationship. What's important is the communication amongst finance, manufacturing, other functions, and business development, as well as an understanding of how joint efforts on many fronts can lead to leveraged cash flow.

Note that the aforementioned cash conversion cycle is another measurement of an organization's success in improving working capital. In the example, it is significant that the incremental cash flow (from \$174 to \$360) is totally available to areas other than operations and/or investment (the example has taken care of these needs). This more than doubling of cash presents opportunities in the form of increased dividends, share buybacks, interest-bearing debt reduction, maintenance of

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excess cash for precautionary and/or speculative motivations, and additional M&A. Several of TRI's own clients have been able to pursue additional M&A for inorganic growth simply by accessing cash that was freed in in a similar manner.

#### Cash Flow for Valuation

Familiarity with primary (but not exhaustive) tools such as net present value (NPV), internal rate of return (IRR), and payback is fundamental to any appropriation request involving long-term investments. Even more fundamental is the need to understand the generation of cash flow. In the world of engineering economics, as academic applications of these tools are often called, forecasting of cash flow, or more specifically, Free Cash Flow (FCF), is at the source of the present value mathematics.

Exhibit 15 provides a definition of FCF:

#### Exhibit 15

Cash Flow for Valuation = Free Cash Flow (FCF)

| NOPAT + (E                          | Dep <sub>E</sub> - Dep <sub>B</sub> ) | + $(A/R_B - A/R_E)$ + $(Inv_B - Inv_E)$ + $(A/P_E - A/P_B)$ | + (P/E <sub>B</sub> - P/E <sub>E</sub> ) |
|-------------------------------------|---------------------------------------|---|--|
| Net Operating<br>Profit After Tax * | Depreciation                          | Working Capital   | Capital<br>Expenditures                  |

\* Operating Margin or EBIT on an After Tax Bases

There are two primary differences between this and TRI Critical Equation #9. Here, NOPAT (net operating profit after tax) replaces the implicit net income and there are no financial flows. The technical reason for the use of NOPAT is that in the derivation of net income, interest may have been subtracted for tax reasons. In engineering economics, the interest charge is picked up in the cost of capital as discussed in TRI Critical Equation #4. To include interest would result in a double count impacting any short- and/or long-term financing. In addition, we exclude financial cash flows here because FCF is what is available to all suppliers of capital. Finally, in a typical proforma version of FCF, the beginning (or  $_B$ ) dollar amount is zero because, for example, we cannot have A/R until we have sales.

In practice, while the application of FCF in Exhibit 15 may appear very mechanical, numerous realworld considerations make its actual estimation difficult.. Exhibit 16 summarizes many of these special considerations.

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Exhibit 16

# **Cash Flow Estimation for Valuation**

### Special Considerations

- Side Effects (Erosion)
- Opportunity Costs
- Allocated Overhead Costs
- Likely Action of Competitors
- What if we did nothing Base Incremental
- Inflation/Deflation
- Residual Value

Project side effects, which can be positive or negative, reflect the fact we are not alone in the world and always must be asking *"If we do this, what will be its impact elsewhere?"* Cannibalization would be a classic example. Opportunity cost reflects the fact that nothing is free (a fundamental truth discussed in TRI Critical Equation #4 on cost of capital).

For example, you may need to spend \$1 million on a warehouse as an upfront cost. You may have an empty warehouse that has a estimated market value of \$1 million. Even though it is obvious you can use that structure and not spend the \$1 million on a new warehouse, you still need to consider the \$1 million as a cash outflow. Allocated overhead should only be considered when your project specifically utilizes the resources of others (i.e., you impact their costs). Otherwise, arbitrary allocation could sink anything. Likely action of competitors, as a consideration, deals with issues relating to the fact that if your organization has great projects and excessive IRRs, so will others (at least eventually).

In appropriation requests, pricing and volume estimates typically will be overestimated, resulting in a negative variance to plan and forecast errors that are routinely found in post-mortems of projects. Always ask "what if we did nothing?" This is a fundamental question and may provide a different view of the problem. This is the heart of incremental analysis. You may think that the do-nothing case would be flat. The reality is the do-nothing case may, in fact, imply an erosion of business. It is off of this lower base that we should be calculating incremental benefits. Inflation/deflation reflects the fact that FCF needs to be nominal (as is the cost of capital at most businesses). Residual value can reflect the freeing up of working capital and other investment on a finite-lived project (which is often missed) or the fact that any M&A application of FCF will typically have a terminal value for

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simplicity. In a finite-lived project without inclusion of residual accounting value, there will be a disconnect between cumulative NOPAT and cumulative cash flow generated (not in a present value sense).

Together, Exhibits 17, 18, 19 and 20 depict a sample appropriation request of Hypo-Product. (The excel model is available upon request.) This is a standard FCF application. The assumptions are in Exhibit 17, as follows:

| A      | ВС         | C D             | E             | F            | G                         | Н                  | 1                  | J                  | K       | L        | М                               | N     | E | F |
|--------|------------|-----------------|---------------|--------------|---------------------------|--------------------|--------------------|--------------------|---------|----------|---------------------------------|-------|---|---|
| 1      |            |                 |               |              |                           |                    |                    |                    |         |          |                                 |       |   | - |
|        |            |                 | Sum           | nam S        | nraadshaat t              | for The C          | ase of "H          | who Pro            | du.     | of!!     |                                 |       |   |   |
| 2      |            |                 | Sum           | ury S        | preuusneer j              | or the C           | use of 11          | yp0-110            | unc     |          |                                 |       | _ |   |
| 3      |            |                 |               |              |                           |                    |                    |                    |         |          |                                 |       | _ |   |
| 4      | A          | ll assumpti     | ions as fo    | und in ca    | se reading - input        | s in Blue Cell     | s only             |                    |         |          |                                 |       | _ |   |
| 5      |            |                 |               |              |                           |                    |                    |                    |         |          |                                 |       | _ |   |
| 6      |            |                 |               |              |                           |                    |                    |                    |         |          |                                 |       |   |   |
| 7      |            |                 |               |              | BOY 1                     | EOY 1              | EOY 2              | EOY 3              |         |          |                                 |       | _ |   |
| 8      | Pr         | ice per Trai    | nsaction      |              |                           | \$10.00            | \$10.50            | \$11.00            | Tı      | ransact  | ions per Day                    | 7     | _ |   |
| 9      |            | Price inf       | flation/defl  | ation        |                           |                    | 5.0%               | 4.8%               | 0       | peratin  | g Days per Year                 | 300   |   |   |
| 10     | Vo         | olume - Tra     | nsactions p   | per Store    | per Year                  | 2,100              | 1,995              | 1,895              | Tı      | ransact  | ions per Store Year 1           | 2100  | _ |   |
| 11     |            | Transaci        | tion Volum    | e growth     |                           |                    | -5.0%              | -5.0%              | G       | rowth -  | Transactions per Store per Year | -5.0% |   |   |
| 12     | St         | ores per Ye     | ar            |              |                           | 250                | 300                | 400                | Ta      | ax Rate  |                                 | 38%   | _ |   |
| 13     |            | Store gro       | owth          |              |                           |                    | 20.0%              | 33.3%              | C       | ost of C | Capital                         | 14.0% | _ |   |
| 14     | Co         | ost of Sales    | (% of Sale    | es)          |                           | 60.0%              | 58.0%              | 55.0%              |         |          |                                 |       |   |   |
| 15     | O          | perating Co     | sts (% of s   | Sales) *     |                           | 20.0%              | 21.0%              | 22.0%              |         |          |                                 |       |   |   |
| 16     | In         | ventory %       | of Sales      |              |                           | 15.0%              | 15.0%              | 15.0%              |         |          |                                 |       |   |   |
| 17     | Re         | eceivables %    | % of Sales    |              |                           | 16.0%              | 16.0%              | 16.0%              |         |          |                                 |       |   |   |
| 18     | Pa         | yables % o      | f Sales       |              |                           | 12.5%              | 12.5%              | 12.5%              |         |          |                                 |       |   |   |
| 19     | Ca         | npital Expen    | ditures       |              | \$2,000,000               |                    |                    |                    |         |          |                                 |       |   |   |
| 20     | Ca         | np in Years     | s             |              | 5                         |                    |                    |                    |         |          |                                 |       |   |   |
| 21     | St         | raight Line     | Depreciati    | ion          |                           | 400,000            | 400,000            | 400,000            |         |          |                                 |       |   |   |
| 22     |            |                 |               |              |                           |                    |                    |                    |         |          |                                 |       |   |   |
| 23     | * <b>E</b> | Excluding Dep   | reciation     |              |                           |                    |                    |                    |         |          |                                 |       |   |   |
| 24     |            |                 |               |              |                           |                    |                    |                    |         |          |                                 |       |   |   |
| 25     | Spi        | readsheet neith | er contains ( | @if conditio | ns (for excluding illogic | cal numbers) nor h | as adjustments for | investment life le | ss thar | n 3 yrs  |                                 |       |   |   |
| 26     |            |                 |               |              |                           |                    |                    |                    |         |          |                                 |       |   |   |
| 27     |            |                 |               |              |                           |                    |                    |                    |         |          |                                 |       | 2 | • |
| 14 4 9 | · •        | Assumption      | ıs - Hypo-P   | roduct 🖉 🛛   | P&L and Cash Flow 🔬 E     | Balance Sheet 🧹    | Metrics 🖉 💋 🦯      |                    |         |          |                                 |       |   |   |

#### Exhibit 17

Note, that the blue areas are input areas and allow for some sensitivity analysis, if desired. It is very common, in an appropriation request, for working capital items to be specified as a percentage of sales.

Run rate for industry is approximately 10 percent. Realistic values are often seen by looking at extant data within the business. The tax rate is always at the margin, not the effective rate (a function of prior decisions). The 14-percent cost of capital would have been derived similarly to our TRI Critical Equation #4.

Exhibit 18 combines the income statement that flows into the FCF format using the aforementioned assumptions.

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|    | А          | В                 | С                    | D                 | E                  | F          | G                  | Н         | l J       | K     |
|----|------------|-------------------|----------------------|-------------------|--------------------|------------|--------------------|-----------|-----------|-------|
| 1  |            |                   |                      |                   |                    |            |                    |           |           |       |
| 2  |            |                   |                      |                   | Project Pro        | fit & Loss | - Cash Fl          | ow        |           |       |
| 3  |            |                   |                      |                   |                    |            |                    |           | Cumulativ | e     |
| 4  |            |                   | P&L                  |                   | BOY 1              | EOY 1      | EOY 2              | EOY 3     | Growth (1 | to 3) |
| 5  |            |                   |                      |                   |                    |            |                    |           |           |       |
| 6  |            |                   | Sales                |                   |                    | 5,250,000  | 6,284,250          | 8,339,100 | 58.8%     |       |
| 7  |            |                   | - Cost of Sales      |                   |                    | 3,150,000  | 3,644,865          | 4,586,505 | 45.6%     |       |
| 8  |            |                   | Gross Margin         |                   |                    | 2,100,000  | 2,639,385          | 3,752,595 | 78.7%     |       |
| 9  |            | - Operating Costs |                      |                   |                    | 1,050,000  | 1,319,693          | 1,834,602 | 74.7%     |       |
| 10 |            |                   | - Depreciation       |                   |                    | 400,000    | 400,000            | 400,000   | 0.0%      |       |
| 11 |            |                   | Operating Man        | gin               |                    | 650,000    | 919,693            | 1,517,993 | 133.5%    |       |
| 12 |            |                   | - Tax                |                   |                    | 247,000    | 349,483            | 576,837   | 133.5%    |       |
| 13 |            |                   | NOPAT                |                   |                    | 403,000    | 570,209            | 941,156   | 133.5%    |       |
| 14 |            |                   | + Depreciation       |                   |                    | 400,000    | 400,000            | 400,000   | 0.0%      |       |
| 15 |            |                   | - Capital Expe       | nditures          | 2,000,000          | 0          | 0                  | 0         |           |       |
| 16 |            |                   | - Inventory Ch       | ange              |                    | 787,500    | 155,138            | 308,228   |           |       |
| 17 |            |                   | - Receivables        | Change            |                    | 840,000    | 165,480            | 328,776   |           |       |
| 18 |            |                   | - Payables Cha       | ange              |                    | 656,250    | 129,281            | 256,856   |           |       |
| 19 |            |                   | Free Cash Flo        | w                 | -2,000,000         | -168,250   | 778,873            | 961,008   | -671.2%   |       |
| 20 |            |                   | Cumulative Fr        | ee Cash Flow      | -2,000,000         | -2,168,250 | <b>-1,389,3</b> 77 | -428,368  |           |       |
| 21 | ▶ <b>)</b> | A                 | sumptions - Hypo-Pro | duct P&L and Casl | Flow Balance Sheet | Metrics 😤  |                    |           |           |       |

#### Exhibit 18

We recommend you always include growth rates in your model as well as cumulative cash flow.

Exhibit 19 represents the proforma balance sheets that correlate to the cash flows.

| A        | В               | С             | D                                   | E               | F              | G          | Н         |   | J | K |
|----------|-----------------|---------------|-------------------------------------|-----------------|----------------|------------|-----------|---|---|---|
| 1        |                 |               |                                     |                 |                |            |           |   |   |   |
| 2        |                 |               |                                     | Project E       | Salance S      | Sheet      |           |   |   |   |
| 3        |                 |               |                                     |                 |                |            |           |   |   |   |
| 4        |                 |               |                                     | BOY 1           | EOY 1          | EOY 2      | EOY 3     |   |   |   |
| 5        |                 |               |                                     |                 |                |            |           |   |   |   |
| 6        |                 |               | Cash*                               | -2,000,000      | -2,168,250     | -1,389,377 | -428,368  |   |   |   |
| 7        |                 |               | Inventory                           | 0               | 787,500        | 942,638    | 1,250,865 |   |   |   |
| 8        |                 |               | Receivables                         | 0               | 840,000        | 1,005,480  | 1,334,256 |   |   |   |
| 9        |                 |               | Gross Investment                    | 2,000,000       | 2,000,000      | 2,000,000  | 2,000,000 |   |   |   |
| 10       |                 |               | - Accumulated Depreciation          | 0               | 400,000        | 800,000    | 1,200,000 |   |   |   |
| 11       |                 |               | Net Investment                      | 2,000,000       | 1,600,000      | 1,200,000  | 800,000   |   |   |   |
| 12       |                 |               | Total Assets                        | 0               | 1,059,250      | 1,758,741  | 2,956,753 |   |   |   |
| 13       |                 |               |                                     |                 |                |            |           |   |   |   |
| 14       |                 |               | Payables                            | 0               | 656,250        | 785,531    | 1,042,388 |   |   |   |
| 15       |                 |               | Borrowings*                         | 0               |                |            |           |   |   |   |
| 16       |                 |               | Retained Earnings (equity)          | 0               | 403,000        | 973,209    | 1,914,365 |   |   |   |
| 17       |                 |               | Total Liabilities & Equity          | 0               | 1,059,250      | 1,758,741  | 2,956,753 |   |   |   |
| 18       |                 |               |                                     |                 |                |            |           |   |   |   |
| 19       |                 |               | Total Capital                       | 2,000,000       | 2,571,250      | 2,362,586  | 2,342,734 |   |   |   |
| 20       |                 |               | at Book - Net WC & Investm          | ent             |                |            |           |   |   |   |
| 21       |                 |               |                                     |                 |                |            |           |   |   |   |
| 22       |                 |               | Balance Sheet Check = 0             | 0               | 0              | 0          | 0         |   |   |   |
| 23       |                 |               |                                     |                 |                |            |           |   |   |   |
| 24       |                 |               | * Negative Cash is corporate invest | ment or assumed | borrowings/equ | ity        |           |   |   |   |
| 4 4 5 51 | Assumptions - I | -lypo-Product | t P&I and Cash Flow Balance         | Sheet Metrics   | / • 1          |            |           | 1 |   |   |

#### Exhibit 19

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Finally, Exhibit 20 shows a summary of many relevant metrics (including the economic profit from TRI Critical Equation #8). "Value creation" refers to the "market value added" in Equation #8. Please note that there is also a cash flow line that includes the residual value as part of the FCF.

| . A  | Α    | В           | С                          | D                | E              | F                     | G                   | Н      | l l                        | J          |
|------|------|-------------|----------------------------|------------------|----------------|-----------------------|---------------------|--------|----------------------------|------------|
| 1    |      |             |                            |                  |                |                       |                     |        |                            |            |
| 2    |      |             |                            |                  | Project        | Metrics               |                     |        |                            |            |
| 3    |      |             |                            |                  |                |                       |                     |        |                            |            |
| 4    |      |             |                            | BOY 1            | EOY 1          | EOY 2                 | EOY 3               |        | Shareholder Value Creation | n          |
| 5    |      |             |                            |                  |                |                       |                     |        |                            |            |
| 6    |      | Gross M     | argin %                    |                  | 40.0%          | 42.0%                 | 45.0%               |        | Net Present Value (NPV)    | 681,662    |
| 7    |      | Operatin    | ng Margin %                |                  | 12.4%          | 14.6%                 | 18.2%               |        | IRR                        | 26.2%      |
| 8    |      | Growth ]    | Rate in Sales              |                  |                | 19.7%                 | 32.7%               |        | Payback (Years)            | TBD        |
| 9    |      | Growth ]    | Rate in Gross Margi        | in               |                | 25.7%                 | 42.2%               |        | Max Cum Cash               | -2,168,250 |
| 10   |      | Growth ]    | Rate in Operating <b>M</b> | fargin           |                | 41.5%                 | 65.1%               |        | Value Creation **          | 681,662    |
| 11   |      | Growth ]    | Rate in Free Cash F        | low              | -91.6%         | -562.9%               | 23.4%               |        |                            |            |
| 12   |      | Change      | in Working Capital         |                  | 971250         | 191336                | 380147              |        |                            |            |
| 13   |      | Free Cas    | sh Flow (FCF)              | -2,000,000       | -168,250       | 778,873               | 961,008             |        |                            |            |
| 14   |      | Residual    | Value *                    |                  |                |                       | 2,342,734           |        | * Residual Value (EOY 3 @  | net book)  |
| 15   |      | FCF with    | n Residual Value           | -2,000,000       | -168,250       | 778,873               | 3,303,742           |        | Inventory                  | 1,250,865  |
| 16   |      | Cumulat     | tive Free Cash Flov        | -2,000,000       | -2,168,250     | -1,389,377            | -428,368            |        | Receivables                | 1,334,256  |
| 17   |      | Total Ca    | pital at Book              | 2,000,000        | 2,571,250      | 2,362,586             | 2,342,734           |        | Payables                   | 1,042,388  |
| 18   |      | NOPAT       |                            | 0                | 403,000        | 570,209               | 941,156             |        | Net Working Capital        | 1,542,734  |
| 19   |      | Capital (   | Charge                     |                  | 280,000        | 359,975               | 330,762             |        | Net Investment             | 800,000    |
| 20   |      | Economi     | ic Profit                  | 0                | 123,000        | 210,234               | 610,394             |        | Total Capital              | 2,342,734  |
| 21   |      |             |                            |                  |                |                       |                     |        |                            |            |
| 22   |      | Return o    | on Total Capital (RC       | OTC) ***         | 17.6%          | 23.1%                 | 40.0%               |        |                            |            |
| 23   |      |             |                            |                  |                |                       |                     |        |                            |            |
| 24   |      | ** Value C  | Creation is present value  | of Economic Proj | it at 14% Valu | e Creation is also re | eferred to as Marke | t Valu | e Added                    |            |
| 25   |      | Note that V | Value Creation and NPV     | are equivalent   |                |                       |                     |        |                            |            |
| 26   |      |             |                            |                  |                |                       |                     |        |                            |            |
| 27   |      | *** At ave  | rage of Total Capital      |                  |                |                       |                     |        |                            |            |
| 28   |      |             |                            |                  |                |                       |                     |        |                            |            |
| 14 4 | ► ►I | Assump      | otions - Hypo-Product      | / P&L and Cash   | Flow / Balance | Sheet Metrics         | s / 💱 /             | 14     |                            |            |

#### Exhibit 20

This appropriation request is very similar to what is found in TRI Critical Equations #4 on cost of capital, #6 on options, and #8 on economic profit. One lesson from our Equation #3 that can also be seen, with a little addition, in Exhibit 20 here is that the sum of expected NOPATs does equal the sum of FCF (including residual value). This was one of our fundamental FP&A premises.

#### Summary

Business leaders in any environment, public or private, whose primary goal is to deliver value, need to know on a practical level how to calculate and balance short- and long-term cash-flow needs. The old saying, "*If the cash does not flow, the answer is no*" *always holds true.* 

The bottom line: Everyone in your organization needs to understand cash flow and how they impact it, positively and negatively. Cash is everyone's responsibility. If you fail to manage cash flow, it will manage you, and most likely in a negative manner. Financial markets are keenly aware of cash flow, and the implications of not managing cash flow can be risk-adjusted inferior total returns to shareholders. The limit condition could be a form of bankruptcy. Cash does, in fact, pay the rent.

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