Technology Economics of Mainframe vs. Distributed Server Intensity:

The Impact of Your Computing Strategy in Real Business Terms

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Abstract
Our multi-year results show that mainframe "heavy" organizations are more economically efficient in supporting business computational demands and have more upward scalability than distributed server "heavy" organizations.

Background
Decisions about computer platform choices and options are typically made without consideration of true business impact from a "cost of goods" or other perspective. As a consequence of what we know about "technology economics" today, platform choices can be based on "fact" and should not decided as a "fashion statement".

During the short 50 year history of what we now call "technology economics", it has always been clear that demand for computing is increasing and that upwards expense pressure is a fact of life in what many have called the information age. Between 2006 and 2010 demand for processing cycles (MIPS, servers, and the like) has slowly approached an 18% annual growth rate in the big banks while storage demand has been growing at 45% or more per year.

With infrastructure spending (computing power, networks, storage, help desks, etc.) historically accounting for 57% of IT expense it is likely the largest component of an organization's "IT cost of goods" – and as such, worthy of investigation and analysis.

Our research, which explores the dynamics of platform economics, indicates that firms with a mainframe computing platform bias ("mainframe heavy") exhibit lower IT cost of goods and overall IT costs in situtations in which the mainframe is a suitable platform. Conversely, "distributed server heavy" firms are at an economic disadvantge – higher IT cost of goods and overall infrastructure costs.

The purpose of this body of research is to chart the interaction (and value) of computing choices and real bottom-line business impacts

About Rubin Worldwide

Rubin Worldwide (www.rubinworldwide.com) is a boutique research and consultancy firm with a unique focus on "technology economics". Since 1982, the founder and CEO Dr. Howard Rubin has been collecting data on the interplay and impact of technology on the global competitiveness of nations, the dynamics of technology investment and its management within companies (and government), and technology costs themselves. In collaboration with Jed Rubin in the mid-1990's, Dr. Rubin started to produce reports on global trends and patterns which now are considered the foundation of the field of technology economics. Rubin's Worldwide data and analytics are used by many of the world's governments, premiere companies, analyst firms, and consultancies to explore the evolving world of technology economics and its impact as a competitive weapon.

Approach

As part of our research, key cost of goods metrics are identified across a wide variety of sectors and industries. Within each sector, analyses are performed to determine average levels of both mainframe and distributed server usage relative to business volumes/revenue. And, within each sector, two groups are identified – "mainframe heavy" and "distributed server heavy" relative to average levels of usage. Within these two groups (by industry) "IT cost of goods" has been computed and compared.

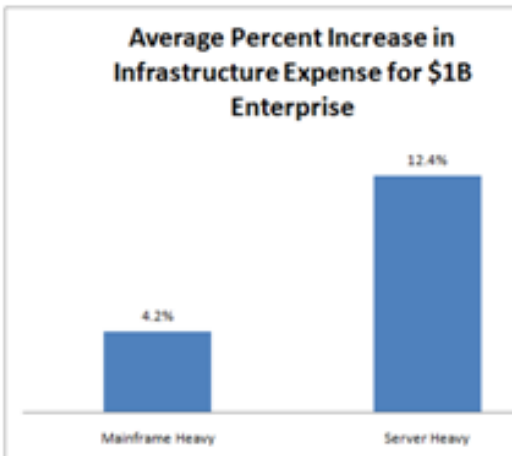
The research database for this study contained data from 498 companies across 20 sectors spanning over the last five years since 2008. Data elements include the amount of computational resources along with key business performance parameters.

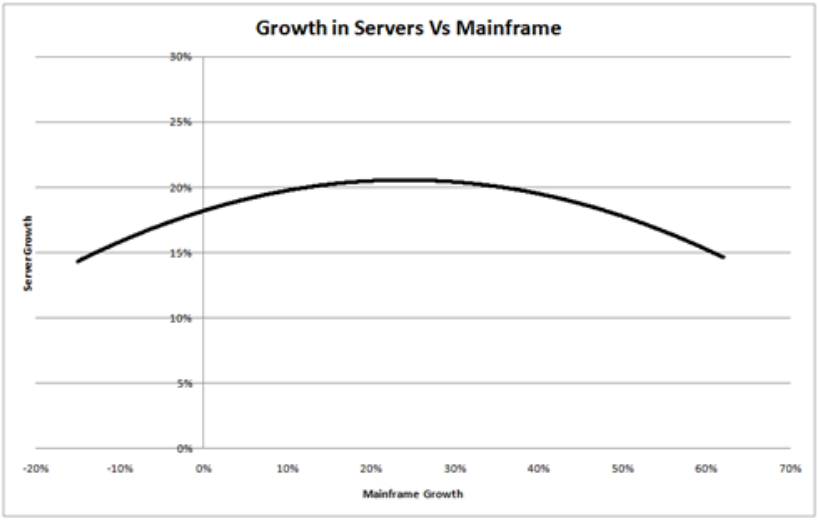
Findings/Results

Across the 498 companies studied, on average, computational needs grew far faster than revenue. MIPS capacity grew at 2.33x the rate of revenue grow while distributed servers grew at 3.5x the rate of revenue growth. (see table below)

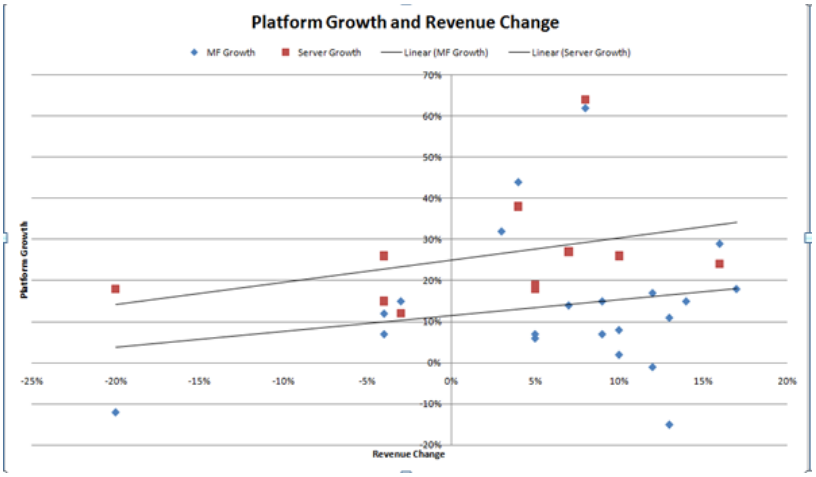
	Change in Mainframe Intensity	Change in Server Intensity	Revenue Change 2011 Vs 2010
Aerospace and Defense	-12%	18%	-20%
Automotive	-15%	16%	13%
Banking	17%	19%	12%
Chemicals and Petroleum	29%	24%	16%
Computer Services	6%	18%	5%
Computer Products	-1%	10%	12%
Electronics	7%	19%	5%
Energy and Utilities	7%	15%	9%
Financial Markets	8%	15%	10%
Govt/National	62%	64%	8%
Govt/State	44%	38%	4%
Healthcare	18%	22%	17%
Industrial Products	15%	23%	14%
Insurance	15%	12%	-3%
Life Sciences	2%	26%	10%
Media & Entertainment	12%	15%	-4%
Professional Services	7%	26%	-4%
Retail	32%	14%	3%
Telecommunications	14%	27%	7%
Travel & Transportation	15%	11%	9%
Wholesale Distribution and Services	11%	18%	13%
Average	**14%**	**21%**	**6%**

Additionally, firms that had higher mainframe growth had 25% lower distributed server growth and exhibited ~67% more effective cost containment than those with less mainframe intensity. (See the 2 charts that follow) The implication is that the required computational growth is roughly 3x more economic efficient in a mainframe environment.





Furthermore as shown in the scatter chart that follows, organizations with high mainframe intensity had 39% more upward scalability in that they could support revenue growth with 61% less investment than those that were distributed server “intense”.



Linking technology costs to business costs

Perhaps the most revealing model for linking technology costs to business costs is to use an "IT cost of goods" perspective. That is to say, "What is the IT expense contribution to an organization's cost of goods?" "And how does infrastructure deployment strategy ultimately affect the measure of impact on the business?"

The variation in costs based on deployment choices is apparent in the table that follows using the proposed "IT Cost of Goods" basis.

Based on an analysis of actual IT spend and business performance comparing companies with a greater than average mainframe mix vs. less than average mainframe mix, organizations may see 31% higher server-based computing platform costs vs. mainframe-based computing costs. In just over the last 3 years, organizations with high mainframe intensity maintained their leverage in terms of lower IT Cost of Goods – across sectors the gap widened by 3% as shown in the chart below.

2011-2012 Analysis							
Industry	Measure	Average IT Cost of Goods	Mainframe Biased	Distributed Biased	% Mainframe Cost Less than Distributed Server	2010-2011 Differential	Change
Bank	Per Teller Transaction	$ 0.290	$ 0.124	$ 0.378	67%	66%	2%
Mortgage	Per Approved Loan	$ 290	$ 98	$ 304	68%	66%	2%
Credit Card	Per Transaction	$ 0.146	$ 0.098	$ 0.189	48%	44%	4%
Railroads	Per Ton Mile	$ 0.0011	$ 0.001	$ 0.002	36%	33%	3%
Armed Service	Per Person	$ 8,819	$ 6,877	$ 10,526	35%	30%	5%
Automotive	Per Vehicle	$ 356	$ 276	$ 400	31%	26%	5%
Retail	Per Store/Door	$ 542,330	$ 433,191	$ 595,789	27%	25%	2%
Utilities	Per MegaWatt Hour	$ 2.58	$ 2.48	$ 3.08	19%	25%	-5%
Hospitals	Per Bed per Day	$ 72.96	$ 56.03	$ 76.46	27%	24%	3%
Oil & Gas	Per Barrel of Oil	$ 2.41	$ 1.79	$ 2.50	28%	23%	5%
Consulting	Per Consultant	$ 57,666	$ 47,888	$ 66,331	28%	22%	6%
Trucking	Per Road Mile	$ 0.185	$ 0.158	$ 0.198	20%	20%	0%
Airlines	Per Passenger Mile	$ 0.008	$ 0.006	$ 0.009	30%	20%	10%
Chemicals	Per Patent	$ 63,489	$ 56,765	$ 63,316	10%	6%	4%
Web Sites	Per Search	$ 0.038	$ 0.039	$ 0.036	-8%	-12%	4%
				Average	31%	28%	3%

The real business impact of platform choices becomes apparent when the differential in IT cost of goods in considered in the context of real business volumes as shown in the next table which highlights findings for some key industries which have been getting national and global attention – mortgage and credit, healthcare, and automotive production.

In the mortgage business the impact on the cost of 1,000,000 loan approvals processed in a mainframe heavy environment versus a distributed environment is over $200M a year. Similarly in the world of credit card processing, with a volume of 1,000,000,000 transactions, the mainframe leverage is over $9B. Numbers of this magnitude would certainly have a material impact on financial services institutions and their profitability and ability to meet capital reserve requirements.

Hospital IT cost of goods for the United States' ~1,000,000 hospital beds would be an astounding $7.5B lower annually with a mainframe biased model – how would that impact healthcare costs?

And for the automobile industry in the U.S. at a production level of 10,000,000 vehicles a year, the differential would be $1.24B – almost an industry "bailout" on its own.

	Volume	Differential of Mainframe Biased Vs Distributed Biased
Mortages	1,000,000 Approved Loans	-$206,360,000
Credit Card	1,000,000,000 Card Transactions	-$9,100,000,000
Automotive	10,000,000 Vehicles	-$1,239,400,000
Hospitals	1,000,000 Beds	-$7,456,220,000

Synposis

Understanding of the mainframe's computational and economic relevance in the context of its contribution to business performance is critical.

This body of research reveals patterns indicating organizations that exhibit more of a mainframe bias versus their peers ultimately:

- Exhibit lower total infrastructure costs (hardware, software networking, storage etc)
- Deliver lower "IT Cost of Goods"
- Are more economically efficient in supporting the computational demands of increased revenue and have more upward scalability than distributed server "heavy" organizations.

Such patterns are critical to observe and understand as computational demand increase in the global economy, in business and government, and in our daily lives.

If 2012-13 is the technology economic "tipping point" – the point at which demand for computing and computing growth outstrips the ability of Moore's Law to offset increased costs,

knowledge and leverage of the pattern exposed by this research – and other key technology economic patterns – will surely be a source of competitive advantage.

Overall Summary and Implications

It is clear that businesses (and government) are becoming more IT "intense" every year. Technology expense is a rising part of business operations expense and is rising relative to revenue. Businesses that have been able to leverage their technology investments have prospered as evidenced by their abilities to grow revenue via technology enabled products, to protect revenue by using technology (and data) to keep them closer to markets and customers, to reduce and avoid cost through targeted automation, and to manage overall risk through use of computer-based scenario models. Recent research (the "Rubin 300") indicates that companies that are technology leaders outperform traditional market indices such as the DJIA and S&P.

For sure, technology economics is still in its infancy. But those companies that can master their own technology economies will clearly have an extreme competitive advantage in a world in which it is becoming more technology "intense" every nanosecond. It is clear that deployment choices do impact cost, not just in technology organizations but in the very fabric of business "Cost of Goods". This body of research indicates that although many consider the mainframe to perhaps be a relic of computing history – it was there at the "ground zero" of technology economics – the cost structure of mainframe computing is highly relevant.
We now know that the marketplace doesn't reward firms that are using only the latest technology at any expense, in the long run it rewards those that make the optimum use of the right computing resources in the right way as evidenced by business performance.

The economic leverage is tremendous. Organizations that make the right "choices" to match processing profiles and processing economics to their business needs will be well on the way to leveraging technology economics – which can improve your bottom line, or go to shareholders or to new investments. Those that master their technology economics may in fact become those companies that prosper in our evolving and complex global economy.