

# The Surprising Technology Economics of Mainframe vs. Distributed Servers:

## Understanding the Impact of Your Strategy in Real Business Terms

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### Abstract

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. In fact with the differential and high intensity of computing in small to medium enterprises, an understanding of the mainframe's computational and economic relevance in the context of its contribution to business performance is critical. The masters of technology economics may in fact become those companies that prosper in our evolving and complex global economy.

### Background: About Rubin Worldwide

Rubin Worldwide ([www.rubinworldwide.com](http://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.

### Background: Technology Economics and Business Performance

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.

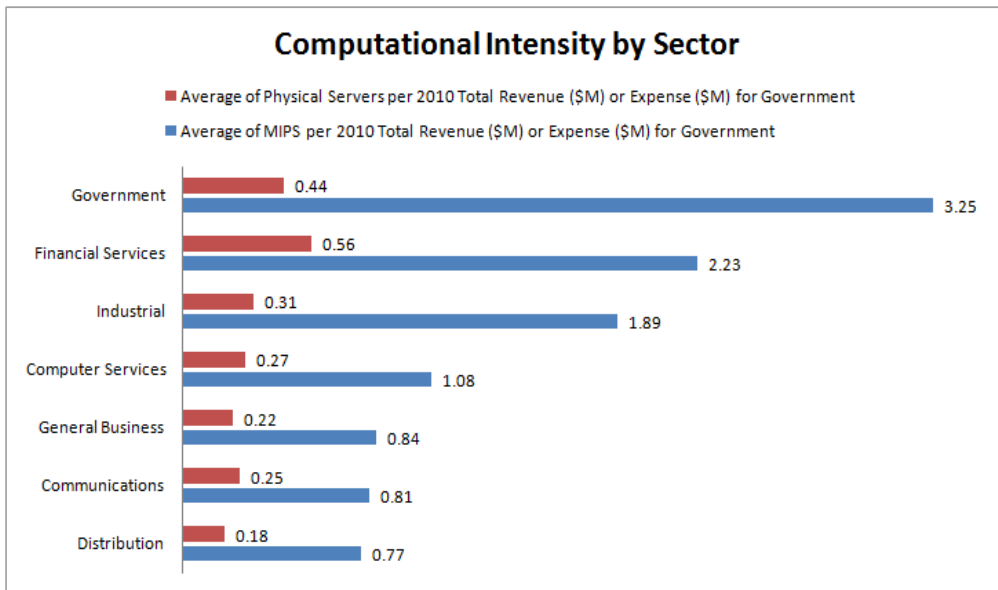
### Background: The Birth of Technology Economics

The field of "technology economics" is in its infancy in comparison to classical economics which some say has its roots with the Greek civilization thousands of years ago. Others consider the start of classical economics to be the publication of Adam Smith's Wealth of Nations on March 11, 1776. It is hard to pinpoint the start date of technology economics, but it is likely around 40-50 years ago with the introduction of mainframe computing into the business community.

One of the first observations in the field has to do with the fact that technology costs relative to revenue and/operating expenses vary widely by sector. The table that follows shows the relative ranking as the first half of 2011:

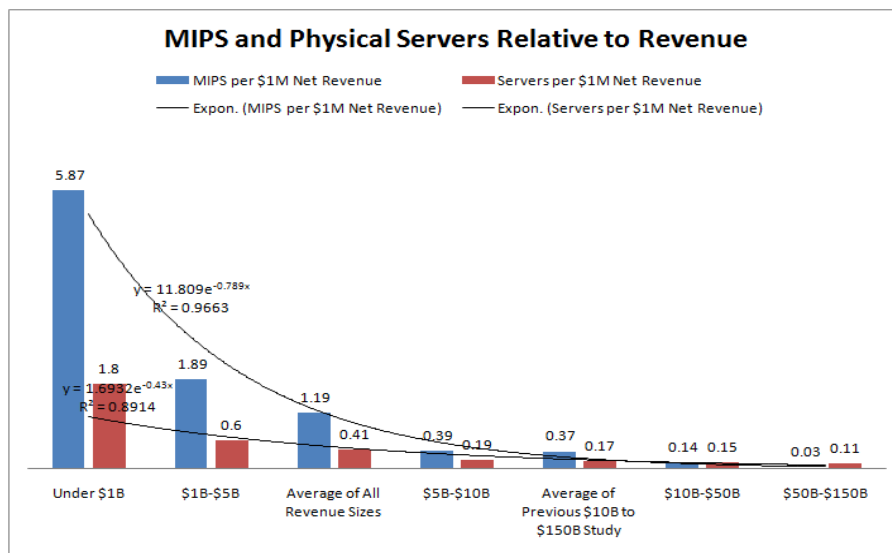
Sector	IT Expense as a % of Revenue	IT Expense as a % of Operating Expense	IT Intensity (Pat. Pending)
Banking and Financial Services	6.0%	7.3%	3.87
Media and Entertainment	4.5%	6.0%	3.49
Telecommunications	3.9%	4.4%	2.99
<b>Cross Sector Average</b>	<b>3.5%</b>	<b>4.3%</b>	<b>2.95</b>
Pharmaceuticals	3.3%	3.6%	2.70
Healthcare	3.2%	3.7%	2.74
Transportation	3.1%	3.3%	2.59
Insurance	3.1%	3.5%	2.66
Utilities	2.5%	3.0%	2.46
Consumer Products	2.0%	2.4%	2.20
Retail	1.4%	1.6%	1.79
Food and Beverage	1.2%	1.4%	1.68
Government		8.5%	4.12

However, the relative use of computing "power" – mainframe and distributed server resources – has been relatively unexplored historically. For 2011, an initial view of the relative use of the aforementioned "power" by sector revealed a similar spread across sectors as shown in the figure below:



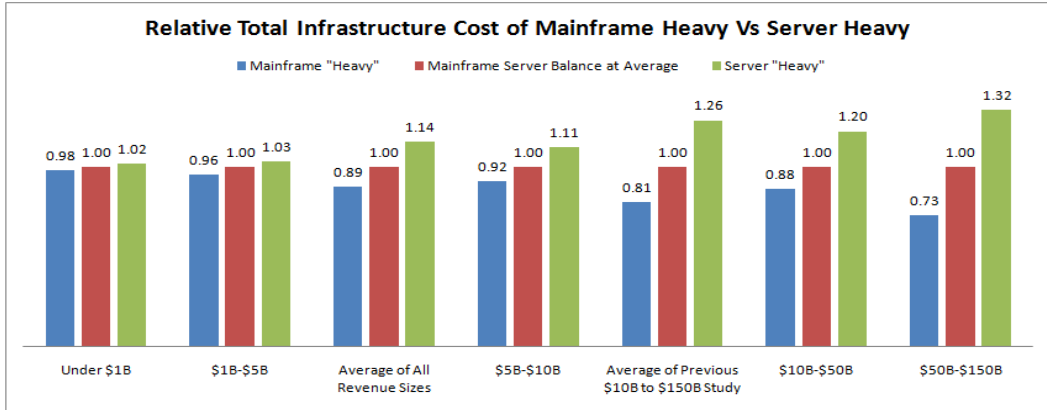
## The Technology Economics of the Mainframe Environment

The latest research effort takes the analysis of such processing needs one step deeper. An analysis of computing resource needs based on company size (as measured by revenue and operating expense) shows the evidence of a new pattern. The metric(s) MIPS per \$1M revenue and physical servers per \$1M revenue are highly correlated with revenue. **The exponential pattern indicates that smaller organizations (as measured by revenue) require more computing resources relative to their size than larger ones (see the chart that follows).**



But as with many phenomena, there is more going on that just can be seen at the surface. Organizations have choices relative to how they fulfill their processing needs. These choices manifest themselves in the mainframe and distributed server strategies that companies make. From past research it is clear that some rely more heavily on mainframe and others on the use of servers. The current analysis indicates that organizations that exhibit more of a Mainframe bias versus their peers (more MIPS per \$1M revenue than average for their sector) ultimately exhibit lower total infrastructure costs (all platforms, storage, and network) than peers that exhibit a distributed Server bias (more servers per \$1M revenue) for their sector.

As shown in the figure that follows, the “spread” for companies in the largest revenue range indicates that total infrastructure cost may be ~60% higher for organizations that are distributed Server “heavy” versus their Mainframe “heavy” peers. The primary drivers of this cost differential are likely data center related (space, power, cooling), and impacted by RAS (Reliability, Availability, and Serviceability) capabilities, systems management, personnel, and propagation of software licensing for the server environment may not be managed effectively.



And how does an infrastructure deployment strategy impact this ratio?

The profiles of "heaviness" evidence the major differences in deployment strategies that peers in the same sector have chosen:

	Average Profile		Mainframe Heavy Profile		Server Heavy Profile	
	Average of MIPS per 2010 Total Revenue (\$M) or Expense (\$M) for Government	Average of Physical Servers per 2010 Total Revenue (\$M) or Expense (\$M) for Government	MIPS per 2010 Total Revenue (\$M) or Expense (\$M) for Government	Physical Servers per 2010 Total Revenue (\$M) or Expense (\$M) for Government	MIPS per 2010 Total Revenue (\$M) or Expense (\$M) for Government	Physical Servers per 2010 Total Revenue (\$M) or Expense (\$M) for Government
Distribution	0.77	0.18	0.93	0.08	0.62	0.54
Communications	0.81	0.25	0.96	0.11	0.65	0.70
General Business	0.84	0.22	1.04	0.09	0.62	0.66
Computer Services	1.08	0.27	1.29	0.13	0.85	0.54
Industrial	1.89	0.31	2.30	0.12	1.45	0.71
Financial Services	2.23	0.56	3.10	0.22	1.75	1.20
Government	3.25	0.44	3.60	0.18	2.60	0.80

### The Mainframe Impact on Business Macroeconomics

And if these swings are looked at from the perspective of just the cost of Mainframe and distributed Server resources and not the total infrastructure cost as discussed earlier, the economic differences that can be attributed to deployment strategy are equally apparent.

Mainframe "heavy" computational costs to support a \$1B organization on average may be 30% lower than a Server "heavy" deployment.

	Mainframe and Server Cost to Support a \$1B Business		
	Cost at Average	Cost MF Heavy	Cost Server Heavy
Distribution	\$ 4,255,273	\$ 3,936,728	\$ 6,809,818
Communications	\$ 4,979,371	\$ 4,306,000	\$ 8,295,000
General Business	\$ 4,832,000	\$ 4,414,000	\$ 7,846,000
Computer Services	\$ 6,093,958	\$ 5,644,350	\$ 7,619,000
Industrial	\$ 9,270,513	\$ 9,082,000	\$ 11,181,000
Financial Services	\$ 12,627,002	\$ 12,742,000	\$ 16,445,000
Government	\$ 15,161,129	\$ 14,148,000	\$ 15,981,703
Average	\$ 8,174,178	\$ 7,753,297	\$ 10,596,789

### The Mainframe Impact on Business Microeconomics – Cost of Goods/Industry View

The discussion so far has focused on the economics of technology alone. A logical next step is to link technology costs to business costs – and perhaps the most revealing model for doing this is to use an "IT cost of goods" perspective. That is to say "what is the IT expense contribution to businesses cost of goods"? And how does the deployment choice affect an infrastructure deployment strategy impact this ratio?" "And how does deployment choice ultimately affect the measure of impact on the business?"

The answer is yet another surprise, or perhaps not much of a surprise based on the analyses presented so far. The variation in costs based on deployment choices is apparent in the table that follows using the proposed "IT Cost of Goods" basis. This early research shows that where appropriate, effective use of Mainframe resources results in a 29% cost advantage over distributed Server heavy deployments.

	IT "Cost of Goods" - Processing Cost per Transaction			to Server Heavy Unit Cost
	Average	Mainframe Heavy	Server Heavy	
Processing Cost per ATM	\$ 928.00	\$ 572.00	\$ 1,021.00	56%
Processing Cost per SKU	\$ 227.27	\$ 184.09	\$ 252.27	73%
Processing Cost per Mobile Subscriber	\$ 23.26	\$ 18.26	\$ 26.12	70%
Processing Cost per Patent	\$ 390.83	\$ 372.00	\$ 401.00	93%
Processing Cost per Claim	\$ 78.00	\$ 56.00	\$ 92.00	61%
			Average	71%

So for example, if we look at the **insurance industry**, the average IT cost of processing an insurance claim in a mainframe heavy environment is approximately \$56, which is \$36 less than the processing cost in a predominately distributed server environment. But think about the implications of what that might mean in terms of number of claims processed. For example, if an insurance company processes 100,000 claims a year, this cost benefit could result in savings of \$3.6 million per year.

Or, if we look at a **telecommunications** company, the average IT cost of processing a mobile subscriber is \$18.26, which is \$7.86 less than the processing cost in a predominantly distributed server environment. Again, think what the implications of this might mean in terms of number of mobile subscribers. If a telecommunications company processes 1 million subscribers a year, cost benefit could result in savings of \$7.8 million or more per year.

In the world of **banking**, when we take it down to the regional and smaller local banks and we look at the IT cost per ATM machine, we find that the average IT cost per ATM machine in technology economic terms is about \$972. We look at the server heavy environment, it's over a thousand, about \$1,021 and we look at the mainframe heavy environment and it's down in the \$500, \$600, \$700 range. So the spread there is massive. It's a differentiation is just tremendous and if you think about it in the world of ATMs heavy transactions, communications, all these other stuff in fact using a mainframe with high utilization to do it, would be logical that the unit cost would go down.

And with **consumer product companies and retailers**, we found the IT cost per SKU in a medium-size small company is about \$227. You look at the server heavy environment that bumps up to about \$252. And compared to a mainframe heavy environment, it's about \$184. Here again is another tremendous spread from one end of the spectrum to the other based on the choices made on mainframe versus distributed server mix.

### **Overall Implications**

There is a real differentiation between companies of size and the computing what they have, and in fact, **smaller enterprises are more sensitive to their choices.**

For sure technology economics is still in its infancy. But those companies that can master their own technology economies will clearly have extreme competitive advantage in a world in which 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.

In fact, with the differential and high intensity of computing in small to medium enterprises, an understanding of the mainframe's computational and economic relevance in the context of its contribution to business performance is critical. Small to medium enterprises are at high risk in making random computing choices based on trends and hearsay instead of considering the true economics.

And for small to medium sized enterprises, the implication of making the right infrastructure decisions is significant. One of the most interesting phenomena if you look consistently at this spread between mainframe heavy and server heavy environments. And you look at the IT cost of goods over the processing in the mainframe heavy world versus the server world you will find out mainframe world is about 71% of the cost of the server world, that's 29% differential time over time. The economic leverage is just tremendous for making the right choices. And that leverage goes to your bottom line, or to the shareholders, or to new investments. So companies have a choice not only the platforms, but how to take the benefits of these technology economic models. ***And in the current economy and the economy we imagine for next 10 years, this is found money...***

### **Bridging mainframe and distributed optimal economics**

There is massive flux; everything from technology to business is constantly changing. Ultimately, looking at the technology economic model here, you need to be able to make choices. And those choices have to consider the impact to the business or organization in both current and future terms. When you make technological decisions about how to process a workload, it might be good for a point in time, but you need something that can bridge you to the future. As our global economy continues to evolve, so too does the mainframe. The latest mainframe technology enables smaller enterprises the flexibility to optimize the deployment of workloads and business processes in a hybrid computing environment that directly integrates both mainframe and distributed servers resources as a single unified system.

So you can imagine the future where you have a workload, you have an economic container, and technology container that supports it, under common management so you can control it better, manage its economics better, but also dynamically make the choices about processing. And that's what you might start to see in the marketplace from IBM zEnterprise System offering. It provides a bridge to the future and integrates multiple technology offerings. Mainframe in its place, distributed servers in their place and Cloud in your future. It gives you everything you need, integration and a way of not having to look back at wrong choices.

### **Summary**

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. Those that master their technology economics may in fact become those companies that prosper in our evolving and complex global economy.