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3 STRATEGY AND INTEGRATED  
5 FINANCIAL RATIO  
7 PERFORMANCE MEASURES:  
9 A LONGITUDINAL MULTI-  
11 COUNTRY STUDY OF HIGH  
13 PERFORMANCE COMPANIES  
15

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21  
23 **ABSTRACT**

25 *Purpose – This study investigates the links between strategy, execution,*  
27 *and financial performance with particular attention to the underlying*  
*performance drivers that describe how a company executes strategy to*  
*create financial value.*

29 *Methodology – This study empirically investigates companies in the*  
31 *United States and 22 other countries over a 20-year period (11 successive*  
33 *10n-year periods: 1988–2007): (1) to compare financial performance*  
*characteristics of HPC versus non-HPC; (2) to study the sustainability*  
*of performance in HPC; and (3) to identify the companies that exit or*

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1 *enter the HPC classification and the performance drivers and performance measures that characterized the change in HPC classification.*

3 Findings – *The 20-year longitudinal results confirm the results of prior*  
5 *studies as to the long-term superior performance of HPC over other*  
7 *companies (Objective 1). For sustaining HPC, results were consistent as*  
9 *to total asset management, profitability, financial risk, and liquidity*  
11 *(Objective 2). Declining HPC companies fail at total asset management,*  
13 *profitability, and operating asset management and significantly increase*  
15 *their financial risk. Emerging HPC companies improve liquidity through*  
17 *improved operating asset management and cash flows (Objective 3).*

13 Practical implications – *To become a HPC management must generate*  
15 *increased cash flows from income, manage receivables and inventory*  
17 *vigorously, and reduce its debt in relation to equity. Thereafter, management*  
19 *must concentrate on maintaining its asset turnover and growth in*  
21 *revenues while maintaining its profit margin and not increasing its debt*  
23 *to equity.*

19 Value of the paper – *The results provide direction for management of*  
21 *companies that aspire to HPC status and to maintain HPC status.*

## 23 INTRODUCTION

25 A recent article published by a Big-Four accounting firm questioned the  
27 ability of companies to sustain or even have predictable high performance.  
29 The authors maintain that total stockholder return (TSR) at any time may  
31 be rising, falling, flat-high, flat-low, or random (no distinguishable pattern).  
The latter characteristic is most common, as represented by the following  
quote:

31 Few firms ... ever change their performance enough to be distinguishable from the roar  
33 of white noise arising from the volatility endemic in a dynamic and unpredictable  
marketplace. (Raynor, Ahmed, & Henderson, 2009)

35 These authors assert that high performance is mainly a result of random  
37 occurrence. However, prior research has shown that a small percentage of  
39 companies can sustain high performance over extended periods of time  
(Frigo, Needles, & Powers, 2002; Needles, Frigo, & Powers, 2004, 2006,  
2008; Needles, Powers, Shigaev, & Frigo, 2007; Frigo & Litman, 2008).  
These studies link strategy, execution, and financial performance with

1 particular attention to the sustainability of high-performance companies  
2 (HPC). They identify the performance drivers associated with five key  
3 performance objectives and link them to the performance drives and to  
4 common performance measures in the financial performance scorecard  
5 (FPS). Further, patterns of these variables for HPC versus other companies  
6 in contrasting economies and economic periods were studied.

7 The present study turns attention to the question of what factors do  
8 companies improve upon to become HPC and what variables tend to  
9 deteriorate when companies cease to be HPC. Specifically, HPC  
10 and integrated financial ratio analysis are empirically investigated for  
11 companies in the United States and 22 other countries over a 20-year period  
12 (1989–2007) in successive 10-year performance periods with the following  
13 objectives: (1) to compare financial performance characteristics of HPC  
14 versus non-HPC over 11 successive 10-year periods, (2) to study the  
15 sustainability of performance in HPC over multiple 10-year periods, and  
16 (3) to identify the companies that exit or enter the HPC classification and  
17 the performance drivers and performance measures that characterized the  
18 change in HPC classification. The results provide direction for management  
19 of companies that aspire the HPC status and for those that want to maintain  
20 HPC status.

## 21 22 **PREVIOUS RESEARCH**

23  
24  
25 Financial statements provide important information about a company's  
26 ability to achieve the strategic objective of creating value for its owners. The  
27 intelligent user of financial statements will be able to discern how well the  
28 company has performed in achieving this objective. Financial analysis  
29 provides the techniques to assist the user in this task. In short, the financial  
30 statements reflect how well a company's management has carried out the  
31 strategic and operating plans of the business. The marketplace, in turn,  
32 evaluates this performance, and a value is placed on the company. Analysts  
33 have traditionally conducted ratio analysis by examining ratios related to  
34 various aspects of a business's operations. Previous research related to  
35 financial statements, financial analysis, and ratio analysis has been conducted  
36 by, among others, Nissim and Penman (1999, 2001), Brief and Lawson  
37 (1992), Fairfield and Yohn (1999), Feltham and Olsson (1995), Fera (1997),  
38 Jansen and Yohn (2002), Lev and Thiagarajan (1993), Ohlson (1995),  
39 Penman (1991), Piotroski (2000), and Selling and Stickney (1989). Soliman  
(2008) provides a thorough review of financial statement analysis literature.

1 Initial research into the link between strategy and value creation began  
2 with an examination of the relation between three contrasting strategies:  
3 efficiency, innovation, and customer service by Needles, Frigo, and Powers  
4 (2002a), which the authors (2002b) then extended to the emerging economy  
5 of India. These studies found that different strategies are characterized  
6 by exceptional performance on different measures, that efficiency and  
7 innovation are better differentiators of high performance than customer  
8 service, and finally that developing and the emerging economy of India  
9 displays similar links among strategies and performance.

10 These early studies were followed by a more comprehensive examination of  
11 the links between strategy and integrated financial performance measurement  
12 by Needles et al. (2004). The objectives of this study were first to identify the  
13 financial characteristics of HPC over a test period (1990–1999) and then to  
14 observe the sustainability of these measures over contrasting test periods  
15 (1997–2000 and 2001–2003). Selection of HPC relied on a decade of research  
16 by Frigo and Litman (2002, 2008) that emphasized and defined a “Return  
17 Driven Strategy” framework under which business activities are highly  
18 aligned with ethically achieving maximum financial performance and  
19 shareholder wealth creation. According to Return Driven Strategy (Frigo &  
20 Litman, 2002, 2008; Frigo, 2003a, 2003b; Litman & Frigo, 2004), the pathway  
21 to superior financial value creation is through the customer, by fulfilling  
22 unmet needs in increasing market segments. The Return Driven Strategy  
23 framework describes the strategic activities of HPC in various industries.  
24 It describes the underlying “strategic performance drivers” that have been  
25 shown to lead to sustainable shareholder wealth creation. It is robust in its  
26 ability to also explain the decline of companies where by charting how the  
27 tenets of Return Driven Strategy were neglected or could not be executed.  
28 Meanwhile, the rise of these companies’ performance and the sustainability  
29 of high performance can be attributed to attention to these tenets. Companies  
30 with mediocre or poor performance demonstrate significant gaps in their  
31 business models when viewed through the lens of Return Driven Strategy.  
32 This work provided the strategic underpinnings of our research.

33 Selected companies determined by Frigo (2003a, 2003b) according to the  
34 following three criteria during the period 1990–1999:

35

- 36 • Cash flow return on investment (Madden, 1999) at twice or more the cost  
37 of capital
- 38 • Growth rates in assets exceeding average gross domestic product growth
- 39 • Relative total shareholder returns above the S&P 500 average or other  
relevant indices.

1 Also included in the HPC group were 10 additional companies identified  
2 by Collins (2001), for a total of 48 companies that demonstrated superior  
3 performance in returns and growth over a sustained period.

4 Comparisons of HPC and other companies served to identify a set of  
5 ratios that were statistically independent of each other and a set of ratios  
6 that interact in integrated financial ratio analysis (Appendices A–C). This  
7 research resulted in the development of the FPS. The FPS is a structure  
8 or framework for considering the interaction of financial ratios, with  
9 particular emphasis on the drivers of performance and their relationship to  
10 performance measures. These performance measures are reflected ultimately  
11 in a return that is compared with a benchmark cost of capital. If the return  
12 exceeds cost of capital, value has been created. If the return is less than cost  
13 of capital, value has been destroyed. The “spread” between return on  
14 investment and the cost of capital was used as a criterion for selecting the  
15 leading companies; however, for purposes of evaluating the FPS, it is  
16 assumed that the cost of capital is determinable and given (Adman &  
17 Haight, 2002; Gebhardt, Lee, & Swaminathan, 2001).

18 The FPS is based on the premise that management must achieve certain  
19 financial objectives in order to create value and that these financial objectives  
20 are interrelated. Further, underlying the performance measures that analysts  
21 and the financial press commonly use to assess a company’s financial  
22 performance are certain independent financial ratios, called performance  
23 drivers, that are critical to achieving the interrelated performance measures.  
24 While HPC uniformly excel on the basis of performance measures, they will  
25 not display uniform characteristics when it comes to performance drivers,  
26 because these measures are more a function of the various strategies that the  
27 companies may employ to achieve high performance (Needles et al., 2004).

28 Specifically, the previous research investigated (1) evidence with regard  
29 to the components of the FPS – in particular, the relationships between the  
30 performance drivers and the performance measures and (2) the relationships  
31 between the performance of the HPC and that of their respective industries.  
32 The empirical results confirmed the basic propositions of the FPS and the  
33 criteria for choosing HPC. These results are summarized as follows:

- 35 1. The performance drivers and performance measures are independent of  
36 each other, as shown by low correlation among each other or low rank  
37 correlation. This proposition held true for all companies, for selected  
38 industries, and for industry leaders, all of which show independence  
39 among the ratios, with low correlations among performance drivers  
(except asset turnover and profit margin) and performance measures.

- 1 2. The criteria for choosing HPC were validated by the performance  
2 measures in the FPS model. The HPC exceed the industry averages  
3 across all performance measures and across all industries.
- 4 3. The HPC show mixed results with regard to performance drivers when  
5 compared with industry drivers. HPC excel on profit margin, are lower  
6 on cash flow yield, have lower financial risk, and have variable results for  
7 asset turnover. These results are due in part to the different strategies that  
8 companies may employ.

9 Subsequently, Needles et al. (2006) replicated the above study with  
10 refinements that focused on the sustainability of performance by HPC and on  
11 operating asset management performance drivers and measures. The goal of  
12 liquidity is closely related to the goal of operating asset management.  
13 Operating asset management is oriented toward the management control  
14 of the cash conversion cycle, which is the time required to make or buy  
15 products, finance the products, and sell and collect for them. Operating asset  
16 management is the ability to utilize current assets and liabilities in a way that  
17 supports growth in revenues with minimum investment. The drivers of  
18 operating asset management are the turnover ratios, and the performance  
19 measures are the days represented by each turnover measure. Taken together,  
20 the performance measures give an indication of the net cash cycle or financing  
21 period. The financing period represents the amount of time during which  
22 a company must provide financing for its operating activities. (Financing  
23 period = days' receivable + days' inventory on hand – days' payable).

24 The hypothesis was that HPC would have a shorter financing period than  
25 S&P companies because their superior financial performance would be a  
26 reflection of their operating efficiency. The results confirmed this expecta-  
27 tion, as follows:

- 28 1. The financing period for HPC compared to S&P companies was shorter in  
29 almost all cases by about 28 days for the 1997–2001 period and 30 days  
30 for the 2002–2003 period, which equates to fewer days that need financing,  
31 thus lowering the financing costs for HPC relative to S&P companies.
- 32 2. The operating asset turnover ratios, however, showed more variability  
33 among industries and between HPC and S&P companies. We expected  
34 HPC to outperform S&P companies on receivables turnover, and this  
35 was generally the case; however, overall, the HPC advantage was non-  
36 significant. This result could be accounted for by the fact that HPC have  
37 less need to sell receivables and take advantage of off-balance-sheet  
38 financing than S&P companies. Further, HPC are better able to take  
39 advantage of trade creditors.

1 3. Inventory turnover ratios were in line with our expectations that the HPC  
2 would outperform the S&P companies. Inventory turnover for HPC  
3 exceeded that of S&P, which represents fewer days of financing needed,  
4 more than offsetting the shortfall from receivables.

5  
6 HPC had a slightly lower payable turnover than S&P companies. Strong  
7 operating results and low debt loads of HPC enable these companies to  
8 obtain longer terms than average from their trade creditors, which  
9 accounted for most of the difference. Thus, the HPC' deficiencies noted  
10 above in receivables and inventory are overcome, so that these companies  
11 outperform their industry on the financing period.

12 In an extension of HPC research to the developing country of India and  
13 to the natural resource-rich country of Australia (Needles et al., 2007), the  
14 relationships among performance drivers and performance measures  
15 observed in the Western economies were found to hold with the exception  
16 of asset turnover in India and payables turnover in both countries. The  
17 low asset turnover ratios in Indian companies were attributed to the  
18 preponderance of asset-intense infrastructure companies among the HPC.  
19 The existence of higher payables turnover in Western developed countries  
20 reflects more willingness to rely on the credit of suppliers in these countries.

## 21 22 23 **RESEARCH QUESTIONS**

24  
25 As noted above, previous research addressed issues of on what measures do  
26 HPC excel and can they sustain high performance over contrasting future  
27 periods. This study focuses first on the long-term nature and sustainability of  
28 high performance as represented by the variables in the FPS and then on the  
29 issue of which performance drivers and measures are most important when  
30 a company attains HPC status and which are most likely to lead to falling from  
31 HPC status. Specifically, this investigation of HPC and integrated financial  
32 ratio analysis by empirically investigating companies in the United States  
33 and 22 other countries over a 20-year period (1988–2007) in successive  
34 10-year performance periods with the following objectives:

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36  
37 Objective 1: To compare financial performance characteristics of HPC  
38 versus non-HPC over 11 successive 10-year periods.

39 Objective 2: To study the sustainability of performance in HPC over  
40 multiple 10-year periods.

1 Objective 3a, 3b: To identify the companies that exit or enter the HPC  
3 classification and the performance drivers and performance measures that  
characterized the change in HPC classification.

5 The long period of study from 1988 to 2007 provides contrasting economic  
7 conditions in which the companies operate. The period reflects a period of  
global growth in the 1990s and a period of great volatility after 2000.

9

## 11 **EMPIRICAL SAMPLE**

13 Data for this study came from the CompuStat database. The analysis  
15 focuses on two groups of companies: companies in the MSCI World  
index, and HPC. In the benchmark group, we started with companies in  
17 the MSCI World index for which data exist consecutively from 1987 to  
2007. Based on this condition, data for 1,446 companies existed (589  
19 companies from USA and 857 companies from other countries). The current  
countries and industries that make the MSCI World Index are shown in  
Appendix D.

21 The following adjustment was made to the benchmark group of MSCI  
World companies: we excluded several industries whose financial structures  
23 typically depart from industrial, retail, and service businesses. These  
industries are banks, savings institutions, credit institutions, other financial  
25 institutions, financial services (broker) companies, insurance companies, real  
estate agents and operators of buildings, real estate investments trusts,  
27 hotels, personal services, miscellaneous recreation services, health services,  
hospitals, educational services, and child day-care services. In total, 172  
29 companies (144 companies from USA and 28 companies from other  
countries) were excluded from the benchmark group. This adjustment  
31 improved the comparability of the benchmark group with the HPC. After  
that screen, our sample had 1,287 MSCI World companies (446 companies  
33 from USA and 841 companies from other countries).

Companies included in the HPC group were removed from the MSCI  
35 World sample in each of the 11 ten-year periods. After all screens, the largest  
size of the benchmark group (1,235 companies) was in 1997–2006 time  
37 period, the smallest size of the benchmark group (1,087 companies) was in  
the first test period 1988–1997.

39 HPC were identified from the HOLT database from Credit Suisse. In  
determining Global HPC, we identified 11 samples of HPC for 11 consecutive

1 10-year periods (from 1988–1997 to 1998–2007) where data were available  
2 from 1987 to 2007 according to the following criteria:

- 3 • Cash flow return on investment (CFROI) at twice or more the cost of  
4 capital or greater than 5% discount rate for 10 consecutive years
- 5 • Cumulative growth rate in total assets over 10-year period exceeds  
6 cumulative growth rate of World GDP over the same 10-year period
- 7 • Cumulative TSRs over 10-year period above the MSCI World cumulative  
8 return over the same 10-year period

## 11 **METHODOLOGY**

13

14 The performance of the HPC was compared to that of their respective  
15 industries and were expected to excel above their industry peers on  
16 performance drivers and measures which are overall indicators of success or  
17 failure in achieving the financial objectives of total asset management,  
18 profitability, financial risk, liquidity, and operating asset management.

19 Appendix C contains the formulas used to calculate ratios in this study.  
20 Ratios were calculated for each company for each year for years 1988–2007  
21 (Year 1987 was used to calculate averages that were used in the formulas).  
22 The next parts of the study examined the performance of sustaining,  
23 declining, and emerging HPC.

In the analyses, HPC were grouped in three categories:

25

- 26 • Sustaining: Companies that appeared in four or more 10-year periods for  
27 years 1988–2007 including both early (first three 10-year time periods) and  
28 late (last three 10-year periods) periods.
- 29 • Declining: Companies that appeared in at least three of the first eight  
30 10-year periods but did not appear at all in the last three 10-year periods.
- 31 • Emerging: Companies that did not appear at all in the first three 10-year  
32 periods but appeared in at least three of the last eight 10-year periods.

33

34 Companies were also grouped by the first two digits of the SIC code. In  
35 the benchmark sample, 51 industries were identified based on this grouping.  
36 In some industries, there were not enough HPC to derive reliable industry  
37 averages and discuss industry-specific results. We provide test data for  
38 industries in which we had at least three HPC (with two-digit SIC indicator).

39

40 For sustaining HPC, the means for each ratio were calculated for the  
41 entire period 1988–2007. For declining HPC, the means for each ratio were  
42 calculated for two periods: 1988–2004 and 1996–2007. The first period

1 (1988–2004) is the period in which certain companies were HPC, and the  
2 second period (1996–2007) is the one in which these companies were not  
3 HPC. For emerging HPC, the means for each ratio were calculated for the  
4 following two periods: 1988–1999 and 1991–2007. No one emerging HPC  
5 held the HPC status in the first period, but all emerging HPC were HPC in  
6 at least three 10-year periods during 1991–2007.

7 The next part of the study examined the relative performance of the HPC  
8 in relation to the mean performance of their peers among MSCI World  
9 index constituents for each of the abovementioned test periods (1988–2007  
10 for sustaining HPC, 1988–2004 and 1996–2007 for declining HPC, and  
11 1988–1999 and 1991–2007 for emerging HPC). We expect “high-perfor-  
12 mance” companies to excel above their industry peers on performance  
13 drivers and measures in periods when they held the HPC status. As to the  
14 periods when declining and emerging HPC did not hold the HPC status, we  
15 expect more variation in their performance.

16 The results are shown both with and without outliers. In order to detect  
17 and eliminate outliers in the samples, we applied the Grubbs’ test (NIST/  
18 SEMATECH). The Grubbs’ test detects one outlier at a time. The outlier is  
19 expunged from the dataset and the test is iterated until no outliers are  
20 detected. There are no outliers at the specific significance level if the Grubbs’  
21 test statistic is less than the upper critical value for the Grubbs’ test  
22 distribution corresponding to that specific level. To get better results on the  
23 *T*-test, we eliminated outliers for various ratios. In all cases, outliers represent  
24 less than 5% of the sample, usually much less than 5%. The elimination of  
25 outliers did not change the conclusions reached in examining the full set  
26 of data, but did affect the significance level on some ratios. In most cases, the  
27 results improved with the elimination of outliers. In the following sections, we  
28 will discuss the results with outliers eliminated, unless otherwise noted.

AU:1

29

31

## FINDINGS

33

### *Descriptive Data*

35 Tables 1 and 2 display descriptive data on HPC for the 11 ten-year periods  
36 from 1988–1997 to 1998–2007. Table 1 shows the three screens for HPC  
37 beginning with CFROI and followed by asset growth and TSR. The number  
38 of HPC generally increased over time and ranged from 13 in the 1988–1997  
39 period to 84 in 1996–2005. Table 2 shows countries from which the HPC  
40 come. While USA companies dominated each of the 10-year periods, all

**Table 1.** The Number of Companies Selected by the Consecutive Application of Each Screen.

Time Period	1988– 1997	1989– 1998	1990– 1999	1991– 2000	1992– 2001	1993– 2002	1994– 2003	1995– 2004	1996– 2005	1997– 2006	1998– 2007
CFROI screen	115	135	154	192	193	182	189	222	267	286	279
Asset growth screen	35	50	58	87	104	101	109	133	181	192	191
TSR screen	13	17	19	29	42	54	56	66	84	77	76

periods had firms from other countries. The number of countries containing HPC generally increased over time. The fewest countries other than the USA were in 1991–2000 with two from France and four from Germany. The 1988–1997 period was represented by the fewest non-USA companies with one each from France, Germany, Japan. The 1996–2005 period was represented by the most non-USA companies and countries. This period had companies from Australia, Canada, Denmark, Spain, Finland, France, Germany, Ireland, Japan, and Sweden. One company represented each of these countries except Germany (11) and Ireland (2). The distributions of HPC by industry for each 10-year period, which are shown in Appendix E, display distributions' considerable diversity among industries. As noted above, industries represented by more than three HPC are tested in analyses below.

*Objective 1: HPC Compared: 1988–2007*

Table 3a addresses the first objective of this paper, to compare financial performance characteristics of HPC versus non-HPC over 11 successive 10-year periods. It provides an overview of HPC performance versus other MSCI companies on performance drivers and performance measures. Columns in Table 3a compare performance drivers and performance measures for all 11 ten-year year periods from 1988 to 2007. These 20-year longitudinal results confirm that the results of prior studies as to the long-term superior performance of HPC over other companies. In achieving the objectives of total asset management, profitability, and financial risk, HPC exceed other MSCI companies the significance differences at the 0.05 level or better in more than 98% of the cases for both performance drivers and performance measures. All differences in performance drivers for total asset management, profit margin, financial risk, and liquidity were significant at the 0.0001 level. This robust result enables HPC to produce growth in

1 **Table 2.** Distribution of HPC by Country for Each 10-Year Period:  
 2 MSCI World.

1988–1997		1989–1998		1990–1999		1991–2000	
Country	Quantity of companies	Country	Quantity of companies	Country	Quantity of companies	Country	Quantity of companies
FRA	1	GBR	3	FRA	1	FRA	2
GBR	1	JPN	1	GBR	3	GBR	4
JPN	1	SGP	1	JPN	1	USA	18
USA	7	USA	9	SGP	1		
				USA	10		
Total	10	Total	14	Total	16	Total	24
1992–2001		1993–2002		1994–2003		1995–2004	
Country	Quantity of companies	Country	Quantity of companies	Country	Quantity of companies	Country	Quantity of companies
FRA	3	DEU	1	CHE	1	DEU	1
GBR	6	FRA	4	DEU	1	DNK	1
JPN	1	GBR	7	ESP	1	ESP	1
SGP	2	SGP	1	FIN	1	FRA	1
USA	24	USA	33	FRA	3	GBR	6
				GBR	6	SGP	1
				SGP	1	SWE	1
				USA	31	USA	34
Total	36	Total	46	Total	45	Total	46
1996–2005		1997–2006		1998–2007			
Country	Quantity of companies	Country	Quantity of companies	Country	Quantity of companies		
DNK	1	AUS	1	AUS	1		
ESP	1	BEL	1	BEL	1		
FIN	1	DNK	1	CHE	3		
FRA	1	GBR	6	DNK	1		
GBR	6	IRL	1	FIN	1		
IRL	1	JPN	1	FRA	1		
JPN	1	SWE	1	GBR	7		
SWE	1	USA	40	HKG	1		
USA	44			IRL	1		
				JPN	1		
				SWE	1		
				USA	40		
Total	57	Total	52	Total	59		

**Table 3.** Global HPC Performance Compared with MSCI World – All 10-Year Periods.

(a) Global HPC: 1988–2007 – Total asset management, profitability, and financial risk

Industry	Performance Drivers			Performance Measures		
	Asset turnover	Profit margin	Debt to equity	Growth in revenues	Return on assets	Return on equity
1988–1997	28.35%	68.60%	–175.19%	50.61%	71.42%	62.91%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1989–1998	23.42%	75.82%	–62.25%	55.32%	73.13%	70.71%
<i>T</i> -test	0.000000	0.000000	0.001688	0.000000	0.000000	0.000000
1990–1999	17.66%	78.30%	–81.45%	74.11%	74.34%	69.01%
<i>T</i> -test	0.000039	0.000000	0.000000	0.000000	0.000000	0.000001
1991–2000	21.05%	70.81%	–90.04%	82.34%	73.04%	62.41%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1992–2001	26.14%	63.10%	–69.86%	73.43%	68.87%	57.62%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1993–2002	24.75%	63.48%	–32.98%	74.49%	67.77%	60.10%
<i>T</i> -test	0.000000	0.000000	0.000021	0.000000	0.000000	0.000000
1994–2003	21.43%	65.87%	–58.30%	77.24%	66.10%	55.85%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1995–2004	29.28%	63.23%	–71.95%	76.62%	66.07%	58.98%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1996–2005	33.13%	59.80%	–52.29%	75.63%	62.17%	60.31%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1997–2006	32.96%	54.86%	–48.18%	75.57%	60.86%	59.53%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1998–2007	33.24%	49.86%	–42.64%	72.42%	59.29%	58.81%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

(b) Global HPC: 1988–2007 – Liquidity

Industry	Performance Driver		Performance Measures	
	Cash flow yield	Cash flow return on total assets	Cash flow return on stockholders' equity	Free cash flow
1988–1997	–127.16%	49.36%	27.96%	88.76%
<i>T</i> -test	0.000000	0.000000	0.001021	0.000000
1989–1998	–91.05%	53.82%	50.06%	87.98%
<i>T</i> -test	0.000000	0.000000	0.049298	0.000000
1990–1999	–77.58%	60.36%	45.93%	90.55%
<i>T</i> -test	0.000000	0.000000	0.007932	0.000000
1991–2000	–91.28%	55.61%	37.59%	87.68%
<i>T</i> -test	0.000000	0.000000	0.006334	0.000000
1992–2001	–76.48%	48.51%	28.51%	79.59%
<i>T</i> -test	0.000000	0.000000	0.000880	0.000000
1993–2002	–86.73%	46.97%	21.42%	80.37%
<i>T</i> -test	0.000000	0.000000	0.003469	0.000000

Table 3. (Continued)

(b) Global HPC: 1988–2007 – Liquidity							
Industry	Performance Driver		Performance Measures				
	Cash flow yield	Cash flow return on total assets	Cash flow return on stockholders' equity	Free cash flow			
1994–2003	–93.96%	44.64%	18.34%	79.16%			
<i>T</i> -test	0.000000	0.000000	0.000116	0.000000			
1995–2004	–95.72%	45.16%	24.57%	78.59%			
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000			
1996–2005	–87.79%	41.94%	24.42%	76.35%			
<i>T</i> -test	0.000000	0.000000	0.000288	0.000000			
1997–2006	–81.14%	42.39%	35.80%	71.64%			
<i>T</i> -test	0.000000	0.000000	0.000475	0.000000			
1998–2007	–83.67%	39.37%	28.99%	68.61%			
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000			
(c) Global HPC: 1988–2007 – Operating asset management							
Industry	Performance Drivers			Performance Measures			
	Receivables turnover	Inventory turnover	Payables turnover	Average days' sales uncollected	Average days' inventory on hand	Average days' payable	Financing period
1988–1997	13.07%	4.23%	12.72%	–15.04%	–4.42%	–14.58%	–5.25%
<i>T</i> -test	0.000485	0.296459	0.086716				
1989–1998	10.06%	8.94%	15.96%	–11.19%	–9.82%	–18.99%	–4.23%
<i>T</i> -test	0.000162	0.106696	0.017797				
1990–1999	26.62%	29.48%	–10.68%	–36.28%	–41.79%	9.65%	–318.63%
<i>T</i> -test	0.031139	0.008284	0.043212				
1991–2000	9.85%	18.85%	11.27%	–10.92%	–23.23%	–12.70%	–21.39%
<i>T</i> -test	0.028273	0.021447	0.007793				
1992–2001	40.38%	15.04%	18.40%	–67.72%	–17.70%	–22.55%	–47.35%
<i>T</i> -test	0.007602	0.008665	0.000001				
1993–2002	37.02%	20.32%	11.39%	–58.77%	–25.51%	–12.85%	–83.27%
<i>T</i> -test	0.009208	0.009351	0.000526				
1994–2003	–5.10%	25.09%	11.59%	4.85%	–33.49%	–13.11%	–10.91%
<i>T</i> -test	0.009795	0.008217	0.007955				
1995–2004	32.40%	35.23%	16.94%	–47.94%	–54.40%	–20.39%	–127.79%
<i>T</i> -test	0.008145	0.001329	0.000003				
1996–2005	44.75%	19.96%	19.53%	–81.00%	–24.93%	–24.27%	–106.24%
<i>T</i> -test	0.000000	0.009709	0.000000				
1997–2006	63.35%	–16.97%	21.56%	–172.84%	14.51%	–27.48%	–26.04%
<i>T</i> -test	0.000000	0.009255	0.000000				
1998–2007	48.75%	–31.19%	15.44%	–95.12%	23.77%	–18.27%	–14.37%
<i>T</i> -test	0.000000	0.009887	0.000000				

1 revenues, return on assets, cash flow return on assets, and free cash flow at  
2 significant levels above other MSCI companies. Further, HPC are able to  
3 accomplish these results with significantly lower financial risk as represented  
4 by the debt to equity ratio. The importance of both asset turnover and profit  
5 margin to achieving high performance was recently confirmed by Soliman  
6 (2008). The only performance driver or performance measure that does  
7 not show significant differences at the 0.05 level is cash flow return on  
8 stockholder's equity. This result results from the lower level of stockholders'  
9 equity by non-HPC companies generally due to lower profitability and  
10 higher debt to equity.

11 Table 3b displays mixed results for operating asset management.  
12 Generally, HPC excel on receivables and inventory management with  
13 differences at the 0.05 level or better over other MSCI companies in over  
14 80% of the cells. This result is in line with prior studies. However, payables  
15 management generally does not show significantly better performance by  
16 HPC. Prior studies of USA companies showed superior (lower) payables  
17 turnovers for HPC but showed the opposite effect in India and Australia.  
18 These differences were attributed to different approaches to supplier  
19 financing in the USA compared to other countries (Needles et al., 2007;  
20 Needles, Powers, & Shigaev, 2009).

21

### 22 *Objective 2: Sustainability of HPC: Multiple 10-Year Periods*

23  
24  
25 Turning to the next objectives of this paper, Table 4 addresses the  
26 sustainability of performance in HPC over multiple 10-year periods.  
27 Table 4a-c shows the performance of sustaining HPC. As noted above,  
28 these are HPC that appear in a majority, or at least 6 of the 11 time periods  
29 including both early and late periods. The tests were conducted for all time  
30 periods to test the sustainability of performance even for periods in which the  
31 companies do not qualify for HPC status. Industry statistics are shown when  
32 an industry (based on the first two SIC classification digits) is represented by  
33 more than three HPC. The following observations may be made:

34  
35 Total asset management, profitability, and financial risk: All performance  
36 drivers and performance measures are significant at the 0.05 level, except  
37 profit margin (very close – 0.053885). These companies are very strong on  
38 asset turnover, growth in revenues, and return on assets with much less debt.  
39 These results also reflect the performance in the four industry groups.  
Return on equity shows consistent results as in Table 3.

1 **Table 4.** Sustaining HPC Performance Compared with MSCI World:  
 1988–2007.

3 (a) Sustaining HPC: 1988–2007 – Total asset management, profitability, and financial risk

5 Industry	6 Performance Drivers			7 Performance Measures		
	8 Asset turnover	9 Profit margin	10 Debt to equity	11 Growth in revenues	12 Return on assets	13 Return on equity
14 28	33.54%	105.88%	25.24%	76.43%	64.31%	72.59%
15 <i>T</i> -test	0.000003	0.000000	0.082269	0.000001	0.000000	0.000002
16 36	−8.74%	81.24%	−116.52%	64.31%	72.91%	72.29%
17 <i>T</i> -test	0.018438	0.000000	0.000024	0.000000	0.000000	0.000000
18 38	4.84%	47.44%	−83.68%	85.38%	46.58%	34.12%
19 <i>T</i> -test	0.091846	0.000000	0.000000	0.000000	0.000000	0.000000
20 73	−3.39%	73.43%	−39.34%	61.10%	64.97%	56.34%
21 <i>T</i> -test	0.292957	0.000000	0.005188	0.000000	0.000000	0.000514
22 All	22.34%	67.80%	−76.73%	79.02%	69.01%	61.51%
23 <i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
24 With outliers						
25 All	21.07%	394.27%	−95.47%	1016.22%	70.87%	48.20%
26 <i>T</i> -test	0.000000	0.053885	0.000016	0.000000	0.000000	0.043067

21 (b) Sustaining HPC: 1988–2007 – Liquidity

23 Industry	24 Performance Driver		25 Performance Measures	
	26 Cash flow yield	27 Cash flow return on total assets	28 Cash flow return on stockholders' equity	29 Free cash flow
30 28	−64.82%	47.14%	52.79%	78.44%
31 <i>T</i> -test	0.000000	0.000000	0.000077	0.000103
32 36	−93.57%	55.76%	41.41%	86.31%
33 <i>T</i> -test	0.000000	0.000000	0.000012	0.000000
34 38	−59.80%	31.71%	11.22%	58.07%
35 <i>T</i> -test	0.000000	0.000000	0.014918	0.000000
36 73	−54.71%	45.68%	26.00%	63.70%
37 <i>T</i> -test	0.000000	0.000000	0.000268	0.000000
38 All	−86.23%	49.89%	29.28%	80.84%
39 <i>T</i> -test	0.000000	0.000000	0.000000	0.000000
40 With outliers				
41 All	−177.29%	52.18%	6.68%	83.63%
42 <i>T</i> -test	0.000000	0.000000	0.442002	0.000000

**Table 4.** (Continued).

(c) Sustaining HPC: 1988–2007 – Operating asset management

Industry	Performance Drivers			Performance Measures			
	Receivables turnover	Inventory turnover	Payables turnover	Average days' sales uncollected	Average days' inventory on hand	Average days' payable	Financing period
28	37.40%	−17.97%	−19.56%	−59.75%	15.23%	16.36%	−26.33%
<i>T</i> -test	0.000000	0.006416	0.000246				
36	33.24%	−10.57%	23.26%	−49.79%	9.56%	−30.31%	−1.13%
<i>T</i> -test	0.000000	0.017200	0.000007				
38	7.06%	15.73%	29.91%	−7.60%	−18.66%	−42.66%	−5.18%
<i>T</i> -test	0.028375	0.013916	0.000000				
73	24.34%	38.49%	−134.33%	−32.17%	−62.57%	57.33%	−716.87%
<i>T</i> -test	0.000020	0.000033	0.000000				
All	6.25%	16.38%	18.64%	−6.67%	−19.59%	−22.91%	−4.64%
<i>T</i> -test	0.001033	0.003643	0.000000				
With outliers							
All	13.92%	−179.41%	−11.65%	−16.18%	64.21%	10.44%	69.88%
<i>T</i> -test	0.386981	0.010381	0.303432				

Liquidity: A prior study (Needles et al., 2006) examined the apparent anomaly of generally lower cash flow yields for HPC. This analysis showed that weak companies tend to have lower incomes and more non-cash adjustments such as restructurings and losses on sales of assets that produce very high artificial cash flow yields. HPC tend to have very consistent cash flow yields in the range of 1.0–3.0. The results in Table 4b are consistent with these prior findings. HPC had lower cash flows yields than other companies and the differences are significant. HPC exceed other MSCI companies by significant amounts (0.0001 level) in cash flow return on assets and free cash flow.

Operating asset management: Contrary to prior research, sustaining HPC do not have significant differences when compared to other MSCI companies on the performance drivers related to operating asset management. The differences in receivable turnover and payables turnover are not significant and inventory turnover is lower. There are some exceptions to this generalization among the industries, especially in receivables turnover and payables turnover.



**Table 5.** Declining HPC Performance Compared with MSCI World: 1988–2004 and 2005–2007.

(a) Declining HPC: 1988–2004 – Total asset management, profitability, and financial risk

Industry	Performance Drivers			Performance Measures		
	Asset turnover	Profit margin	Debt to equity	Growth in revenues	Return on assets	Return on equity
36	9.91%	88.03%	–366.03%	72.76%	78.14%	75.00%
<i>T</i> -test	0.143812	0.000000	0.000000	0.000003	0.000000	0.000000
73	35.18%	67.92%	–121.17%	66.93%	69.37%	59.90%
<i>T</i> -test	0.000008	0.000000	0.000002	0.000023	0.000000	0.007373
All	14.30%	73.35%	–182.97%	84.87%	70.90%	54.88%
<i>T</i> -test	0.001003	0.000000	0.000000	0.000000	0.000000	0.000000
With outliers						
All	12.82%	150.86%	–171.51%	2,587.59%	73.25%	62.47%
<i>T</i> -test	0.002768	0.000001	0.000001	0.000001	0.000000	0.000007

(b) Declining HPC: 1996–2007 – Total asset management, profitability, and financial risk

Industry	Performance Drivers			Performance Measures		
	Asset turnover	Profit margin	Debt to equity	Growth in revenues	Return on assets	Return on equity
36	–2.88%	85.52%	–304.79%	–32.79%	69.43%	69.27%
<i>T</i> -test	0.424316	0.002355	0.000000	0.303925	0.000167	0.006055
73	15.90%	–3.58%	–120.41%	–311.58%	–2.90%	–228.12%
<i>T</i> -test	0.161063	0.464609	0.000011	0.006939	0.462993	0.061167
All	–8.42%	66.92%	–179.23%	–124.15%	49.47%	20.67%
<i>T</i> -test	0.181817	0.000001	0.000000	0.001166	0.000000	0.075614
With outliers						
All	–5.72%	475.98%	–20.31%	7,385.32%	55.17%	57.52%
<i>T</i> -test	0.278002	0.068450	0.387008	0.000001	0.000000	0.160190

(c) Declining HPC: 1988–2004 – Liquidity

Industry	Performance Driver		Performance Measures	
	Cash flow yield	Cash flow return on total assets	Cash flow return on stockholders' equity	Free cash flow
36	–176.15%	53.94%	27.53%	89.71%
<i>T</i> -test	0.000000	0.000000	0.000252	0.000000
73	–70.60%	53.10%	20.12%	69.00%
<i>T</i> -test	0.000000	0.000000	0.252205	0.000008

*Table 5. (Continued)*

(c) Declining HPC: 1988–2004 – Liquidity							
Industry	Performance Driver			Performance Measures			
	Cash flow yield	Cash flow return on total assets		Cash flow return on stockholders' equity	Free cash flow		
All	–115.04%	49.74%		9.91%			82.23%
<i>T</i> -test	0.000000	0.000000		0.151154			0.000000
With outliers							
All	–234.61%	52.81%		25.20%			85.24%
<i>T</i> -test	0.000000	0.000000		0.122561			0.000000
(d) Declining HPC: 1996–2007 – Liquidity							
Industry	Performance Driver			Performance Measures			
	Cash flow yield	Cash flow return on total assets		Cash flow return on stockholders' equity	Free cash flow		
36	–132.64%	42.78%		20.56%			75.84%
<i>T</i> -test	0.000000	0.029210		0.210261			0.020126
73	39.88%	31.55%		–55.43%			55.03%
<i>T</i> -test	0.067484	0.000101		0.157374			0.000014
All	–30.17%	23.47%		–47.54%			67.57%
<i>T</i> -test	0.047270	0.002417		0.003151			0.000001
With outliers							
All	–16.45%	24.53%		59.60%			70.36%
<i>T</i> -test	0.342193	0.001671		0.224105			0.000000
(e) Declining HPC: 1988–2004 – Operating asset management							
Industry	Performance Drivers			Performance Measures			
	Receivables turnover	Inventory turnover	Payables turnover	Average days' sales uncollected	Average days' inventory on hand	Average days' payable	Financing period
36	31.36%	–0.63%	24.56%	–45.69%	0.63%	–32.56%	–8.66%
<i>T</i> -test	0.000000	0.471736	0.007070				
73	31.13%	17.07%	23.98%	–45.21%	–20.58%	–31.54%	–40.54%
<i>T</i> -test	0.000031	0.234730	0.073140				
All	–6.82%	–29.85%	17.18%	6.39%	22.99%	–20.74%	38.31%
<i>T</i> -test	0.009095	0.009525	0.045772				
With outliers							
All	–72.30%	–121.78%	9.52%	41.96%	54.91%	–10.52%	82.54%
<i>T</i> -test	0.000000	0.000000	0.208238				

**Table 5.** (Continued).

(f) Declining HPC: 1996–2007 – Operating asset management

Industry	Performance Drivers			Performance Measures			
	Receivables turnover	Inventory turnover	Payables turnover	Average days' sales uncollected	Average days' inventory on hand	Average days' payable	Financing period
36	35.20%	−48.15%	17.96%	−54.32%	32.50%	−21.89%	22.54%
9 <i>T</i> -test	0.007738	0.023912	0.248667				
73	18.25%	81.26%	35.45%	−22.33%	−433.58%	−54.92%	−65.95%
11 <i>T</i> -test	0.060075	0.005619	0.013646				
All	−14.14%	49.21%	26.80%	12.39%	−96.88%	−36.61%	−11.92%
13 <i>T</i> -test	0.008343	0.049997	0.030252				
With outliers							
15 All	−75.66%	−21.92%	−21.91%	43.07%	17.98%	17.98%	67.63%
<i>T</i> -test	0.000003	0.355733	0.260270				

financial risk as represented by the increase in debt to equity (Table 6a). Liquidity in the form of cash flow yield declined but not significantly (Table 6b). As a result, cash flow return on assets, and free cash were not as strongly affected.

*Objective 3b: Characteristics of Companies that Enter HPC Status (Emerging HPC)*

This section examines emerging HPC (Tables 7 and 8), which are defined as companies that did not appear at all in the first three 10-year periods but appeared in at least three of the last eight 10-year periods.

Total asset management, profitability, and financial risk: During the period 1988–1999, emerging HPC showed results that would be expected of HPC by excelling across all performance drivers and performance measures for this objective except for debt to equity. This was true across the six industries except that five of the six industries did not have a significant difference in asset turnover and five did not in growth in revenues (Table 7a). In the following period 1991–2007 when these companies achieved HPC status (Table 7b), the HPC increased its advantage across all performance drivers and performance measures including debt to equity, which decreased their financial risk.

**Table 6.** Declining HPC Performance: 1988–2004  
Compared to 1996–2007.

(a) Declining HPC: 1988–2004 to 1996–2007 – Total asset management, profitability, and financial risk

Time period	Performance Drivers			Performance Measures		
	Asset turnover	Profit margin	Debt to equity	Growth in revenues	Return on assets	Return on equity
1988–2004	1.17	0.16	0.82	0.15	0.15	0.22
1996–2007	0.88	0.16	0.80	0.04	0.10	0.15
Difference	-0.2861	-0.0039	-0.0183	-0.1091	-0.0501	-0.0682
% Difference	-24.45%	-2.43%	-2.23%	-75.22%	-34.11%	-31.57%
T-test	0.001943	0.426542	0.437614	0.000000	0.000002	0.002160

(b) Declining HPC: 1988–2004 to 1996–2007 – Liquidity

Time period	Performance Driver	Performance Measures		
	Cash flow yield	Cash flow return on total assets	Cash flow return on stockholders' equity	Free cash flow
1988–2004	1.38	0.20	0.30	0.10
1996–2007	2.12	0.13	0.18	0.07
Difference	0.7388	-0.0676	-0.1108	-0.0300
% Difference	53.41%	-33.90%	-37.46%	-28.55%
T-test	0.027805	0.000006	0.004493	0.014698

(c) Declining HPC: 1988–2004 to 1996–2007 – Operating asset management

Time period	Performance Drivers			Performance Measures			
	Receivables turnover	Inventory turnover	Payables turnover	Average days' sales uncollected	Average days' inventory on hand	Average days' payable	Financing period
1988–2004	7.63	6.00	8.76	47.85	60.86	41.67	67.05
1996–2007	8.07	15.54	10.06	45.25	23.49	36.28	32.46
Difference	0.4392	9.5402	1.2999	-2.6053	-37.3724	-5.3838	-34.5940
% Difference	5.76%	159.09%	14.84%	-5.44%	-61.40%	-12.92%	-51.59%
T-test	0.191187	0.022151	0.217587				

Liquidity: In Table 7c, cash flow yield for HPC in the non-HPC period 1988–1999 was as expected – not significantly different from other MSCI companies. Only free cash flow showed an advantage for emerging HPC. These conclusions hold for all six industries with the exception of industry 56.

**Table 7.** Emerging HPC Performance Compared with MSCI World: 1988–1999 and 1991–2007.

(a) Emerging HPC: 1988–1999 – Total asset management, profitability, and financial risk						
Industry	Performance Drivers			Performance Measures		
	Asset turnover	Profit margin	Debt to equity	Growth in revenues	Return on assets	Return on equity
28	34.26%	229.05%	42.48%	65.66%	39.35%	64.15%
<i>T</i> -test	0.001907	0.000182	0.061189	0.001068	0.012035	0.013347
35	39.35%	14.46%	−33.94%	76.40%	33.23%	72.85%
<i>T</i> -test	0.003258	0.358477	0.009454	0.013437	0.200397	0.057933
36	−0.05%	−20.46%	38.98%	55.81%	32.61%	10.54%
<i>T</i> -test	0.498268	0.342434	0.104764	0.020335	0.130826	0.418015
38	23.04%	50.84%	−51.74%	62.98%	60.17%	50.72%
<i>T</i> -test	0.000001	0.000186	0.000447	0.000180	0.000000	0.000000
56	−15.79%	31.10%	18.59%	4.65%	30.41%	−61.28%
<i>T</i> -test	0.101198	0.088767	0.305533	0.477096	0.065961	0.291412
73	−29.21%	73.31%	−9.99%	66.97%	36.19%	40.32%
<i>T</i> -test	0.020933	0.000175	0.314582	0.000266	0.066274	0.021074
All	28.00%	44.50%	−31.00%	64.77%	53.04%	48.04%
<i>T</i> -test	0.000000	0.000003	0.001503	0.000000	0.000000	0.000000
With outliers						
All	29.03%	115.67%	14.73%	608.18%	53.33%	54.73%
<i>T</i> -test	0.000000	0.000002	0.263174	0.009646	0.000000	0.154259
(b) Emerging HPC: 1991–2007 – Total asset management, profitability, and financial risk						
Industry	Performance Drivers			Performance Measures		
	Asset turnover	Profit margin	Debt to equity	Growth in revenues	Return on assets	Return on equity
28	36.80%	98.26%	−25.91%	63.89%	59.02%	68.88%
<i>T</i> -test	0.000000	0.000000	0.001263	0.000038	0.000000	0.000135
35	45.64%	43.16%	31.74%	63.53%	60.84%	70.72%
<i>T</i> -test	0.000000	0.002158	0.002877	0.000098	0.000008	0.001071
36	16.03%	77.59%	−105.49%	63.59%	72.53%	73.34%
<i>T</i> -test	0.001445	0.000000	0.000000	0.000096	0.000000	0.000000
38	14.30%	42.08%	−35.43%	77.49%	49.56%	54.96%
<i>T</i> -test	0.000005	0.000000	0.000128	0.000000	0.000000	0.000007
56	−3.77%	45.52%	−29.62%	28.83%	45.30%	52.87%
<i>T</i> -test	0.237880	0.000000	0.063096	0.003591	0.000000	0.000063
73	−3.34%	63.32%	−69.26%	60.00%	49.50%	53.01%
<i>T</i> -test	0.266246	0.000000	0.000000	0.000150	0.000000	0.000075
All	34.33%	56.56%	−82.53%	76.68%	64.56%	62.21%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
With outliers						
All	34.97%	504.76%	−67.63%	1,168.27%	67.10%	56.41%
<i>T</i> -test	0.000000	0.068641	0.001361	0.000276	0.000000	0.000000

*Table 7. (Continued).*

(c) Emerging HPC: 1988–1999 – Liquidity

Industry	Performance Driver		Performance Measures	
	Cash flow yield	Cash flow return on total assets	Cash flow return on stockholders' equity	Free cash flow
28	18.88%	14.09%	57.47%	170.77%
<i>T</i> -test	0.181282	0.192206	0.037864	0.008682
35	7.22%	−3.33%	−109.59%	66.39%
<i>T</i> -test	0.463555	0.468291	0.350863	0.287761
36	−113.78%	2.43%	7.38%	−89.08%
<i>T</i> -test	0.000017	0.462263	0.383580	0.293030
38	−69.70%	42.69%	14.44%	79.97%
<i>T</i> -test	0.000047	0.000003	0.077093	0.000004
56	–	–	–	–
<i>T</i> -test	–	–	–	–
73	−56.92%	−80.24%	−41.52%	−225.20%
<i>T</i> -test	0.008531	0.003971	0.022947	0.061612
All	−62.57%	14.68%	−0.41%	84.85%
<i>T</i> -test	0.000000	0.015313	0.486649	0.000010
With outliers				
All	−52.26%	13.29%	−302.66%	95.53%
<i>T</i> -test	0.016231	0.057724	0.118328	0.000251

(d) Emerging HPC: 1991–2007 – Liquidity

Industry	Performance Driver		Performance Measures	
	Cash flow yield	Cash flow return on total assets	Cash flow return on stockholders' equity	Free cash flow
28	−66.49%	36.81%	50.99%	60.88%
<i>T</i> -test	0.000000	0.000000	0.000111	0.000000
35	−34.43%	56.80%	66.97%	79.52%
<i>T</i> -test	0.001668	0.000071	0.001262	0.000046
36	−128.84%	49.82%	35.61%	85.16%
<i>T</i> -test	0.000000	0.000000	0.000029	0.000000
38	−64.36%	31.98%	31.06%	57.31%
<i>T</i> -test	0.000000	0.000000	0.000298	0.000000
56	−16.64%	41.57%	54.67%	57.97%
<i>T</i> -test	0.009793	0.000000	0.000236	0.004390
73	−74.39%	23.05%	15.35%	48.96%
<i>T</i> -test	0.000000	0.000670	0.017206	0.000050
All	−90.78%	42.52%	32.10%	76.72%
<i>T</i> -test	0.000000	0.000000	0.000000	0.000000
With outliers				
All	−184.58%	43.93%	28.91%	80.51%
<i>T</i> -test	0.000000	0.000000	0.009931	0.000000

**Table 7. (Continued).**

(e) Emerging HPC: 1988–1999 – Operating asset management

Industry	Performance Drivers			Performance Measures			
	Receivables turnover	Inventory turnover	Payables turnover	Average days' sales uncollected	Average days' inventory on hand	Average days' payable	Financing period
28	35.64%	-21.47%	-9.24%	-55.37%	17.67%	8.46%	-14.13%
<i>T</i> -test	0.001860	0.111564	0.222846				
35	34.35%	-0.06%	11.62%	-52.31%	0.06%	-13.15%	-22.78%
<i>T</i> -test	0.000765	0.498630	0.227239				
36	8.61%	-87.23%	-2.53%	-9.42%	46.59%	2.47%	39.24%
<i>T</i> -test	0.057223	0.000837	0.455240				
38	22.24%	-17.54%	38.46%	-28.60%	14.92%	-62.50%	16.52%
<i>T</i> -test	0.000000	0.012931	0.000002				
56	-1267.93%	-2.67%	-66.45%	92.69%	2.60%	39.92%	58.89%
<i>T</i> -test	0.000000	0.373327	0.000000				
73	-32.55%	-	49.18%	24.55%	-	-96.78%	-
<i>T</i> -test	0.002989	-	0.027964				
All	-28.39%	-113.63%	24.47%	22.11%	53.19%	-32.39%	68.14%
<i>T</i> -test	0.000000	0.000000	0.000019				
With outliers							
All	-15.12%	-218.85%	16.47%	13.13%	68.64%	-19.72%	84.56%
<i>T</i> -test	0.144357	0.000000	0.004374				

(f) Emerging HPC: 1991–2007 – Operating asset management

Industry	Performance Drivers			Performance Measures			
	Receivables turnover	Inventory turnover	Payables turnover	Average days' sales uncollected	Average days' inventory on hand	Average days' payable	Financing period
28	26.35%	-21.88%	-57.83%	-35.77%	17.95%	36.64%	-51.00%
<i>T</i> -test	0.000001	0.006062	0.000000				
35	34.99%	79.58%	-10.00%	-53.83%	-389.82%	9.09%	
	0.000132	0.200496			-3,054.20%	<i>T</i> -test	0.000027
36	30.42%	7.82%	17.72%	-43.72%	-8.48%	-21.53%	-23.67%
<i>T</i> -test	0.000000	0.139892	0.000854				
38	13.05%	-7.15%	18.39%	-15.01%	6.67%	-22.53%	6.50%
<i>T</i> -test	0.000000	0.100099	0.000007				
56	50.92%	19.43%	36.06%	-103.75%	-24.12%	-56.41%	-17.28%
<i>T</i> -test	0.001949	0.000952	0.000000				
73	-10.28%	55.13%	-56.41%	9.32%	-122.86%	36.07%	-117.49%
<i>T</i> -test	0.111622	0.007822	0.000002				
All	52.80%	-20.42%	17.04%	-111.87%	16.96%	-20.53%	-42.78%
<i>T</i> -test	0.000015	0.032518	0.000000				
With outliers							
All	48.74%	-82.44%	-10.12%	-95.09%	45.19%	9.19%	-231.32%
<i>T</i> -test	0.022442	0.071466	0.335232				

**Table 8.** Emerging HPC Performance: 1988–1999  
Compared to 1991–2007.

(a) Emerging HPC: 1988–1999 to 1991–2007 – Total asset management, profitability, and financial risk

Time period	Performance Drivers			Performance Measures		
	Asset turnover	Profit margin	Debt to equity	Growth in revenues	Return on assets	Return on equity
1988–1999	1.44	0.06	1.82	0.14	0.09	0.20
1991–2007	1.50	0.11	1.24	0.14	0.13	0.30
Difference	0.0539	0.0438	−0.5795	0.0064	0.0385	0.0983
% Difference	3.73%	69.18%	−31.91%	4.76%	41.15%	49.50%
T-test	0.232970	0.000000	0.001409	0.303765	0.000000	0.000001

(b) Emerging HPC: 1988–1999 to 1991–2007 – Liquidity

Time period	Performance Driver	Performance Measures		
	Cash flow yield	Cash flow return on total assets	Cash flow return on stockholders' equity	Free cash flow
1988–1999	1.68	0.12	0.26	0.05
1991–2007	1.45	0.18	0.40	0.10
Difference	−0.2337	0.0548	0.1404	0.0523
% Difference	−13.92%	44.96%	53.41%	111.44%
T-test	0.053853	0.000000	0.000064	0.000000

(c) Emerging HPC: 1988–1999 to 1991–2007 – Operating asset management

Time period	Performance Drivers			Performance Measures			
	Receivables turnover	Inventory turnover	Payables turnover	Average days' sales uncollected	Average days' inventory on hand	Average days' payable	Financing period
1988–1999	6.68	3.94	9.41	54.61	92.65	38.78	108.48
1991–2007	17.99	9.38	8.79	20.29	38.93	41.54	17.68
Difference	11.3071	5.4358	−0.6253	−34.3247	−53.7164	2.7593	−90.8004
% Difference	169.18%	137.98%	−6.64%	−62.85%	−57.98%	7.12%	−83.70%
T-test	0.000000	0.000000	0.141631				

In the following HPC period 1991–2007 (Table 7d), all measures of cash flows for HPC are strongly differentiated from non-HPC. Cash flow yield is lower, as is now expected (see discussion above), and cash return on total assets and free cash flows are strongly positive. Further, all industry groups

1 are differentiated on cash flow measures with one exception (cash flow yield  
3 for industry 56). As noted earlier, cash flow return on stockholders' equity is  
not a differentiator.

Operating asset management: In the 1988–1999 period when they did not  
5 have HPC status (Table 7e), the emerging HPC scored significantly less on  
receivables and inventory turnover but had a greater payables turnover than  
7 other MSCI companies in the 1988–1999 period. There were few significant  
differences among the industry groups. In the HPC period 1991–2007  
9 (Table 7f), the HPC improved both in receivable turnover and payables  
turnover but still fell short in inventory turnover. More significant  
11 differences showed up in the industry groupings.

13 To summarize, Table 8 compares emerging HPC in their HPC period to  
their non-HPC period across all performance drivers and performance  
15 measures. When HPC began to achieve HPC status, the objectives of total  
asset management, profitability, and operating asset management improved  
17 relative to other MSCI firms. The increases in asset turnover and profit  
margin and the decrease in debt to equity may be seen in Table 8a. All cash  
19 flow performance measures showed increases with cash flow return on total  
assets, cash flow return on equity, and free cash flow, as usual, being at a  
21 significant level. Cash flow yield declined in the latter period but was not  
significantly different from the earlier period when they were non-HPC  
23 companies. Operating asset management (Table 8c), especially receivables  
turnover and inventory turnover improved dramatically when HPC status  
25 was achieved, increasing 169.18 and 137.98%, respectively.

## 27 CONCLUSION

29 This paper began with three objectives:

31 Objective 1: To compare financial performance characteristics of HPC  
versus non-HPC over 11 successive 10-year periods.

33 Objective 2: To study the sustainability of performance in HPC over  
multiple 10-year periods.

35 Objective 3a, 3b: To identify the companies that exit or enter the HPC  
classification and the performance drivers and performance measures that  
37 characterized the change in HPC classification.

39 It investigated these issues by studying HPC and integrated financial ratio  
analysis empirically for companies in the United States and 22 other

1 countries (represented by the MSCI Index) over a 20-year period (1988–  
2007) in 11 successive 10-year performance periods by quoting an article  
3 that suggests that much high performance is achieved randomly.

4 With regard to objective 1, the 20-year longitudinal results confirm with  
5 few exceptions the results of prior studies as to the long-term superior  
6 performance of HPC over other companies. With regard to objective 2,  
7 companies that were sustaining HPC over at least 6 of the 11 ten-year  
8 periods, results were consistent for measures related to total asset manage-  
9 ment, profitability, financial risk, and liquidity. Operating asset measures  
10 were not consistent with prior research. With regard to objective 3a,  
11 companies who fail to maintain HPC status fail at total asset management,  
12 profitability, and operating asset management. Further, they significantly  
13 increase their financial risk. With regard to objective 3b, companies  
14 achieving HPC status usually have previously improved profitability but  
15 they significantly improve liquidity and cash flows when they become HPC.  
16 Further, they improve operating asset management and lower financial risk.

17 The implications for management are clear. In short, when a company  
18 becomes highly profitable, to become a HPC management must concentrate  
19 on generating cash flows from income, manage receivables and inventory  
20 vigorously, and reduce debt in relation to equity. When a company achieves  
21 HPC status, management must concentrate on maintaining asset turnover  
22 and growth in revenues while maintaining profit margin while not increasing  
23 debt in relation to equity.

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27

## LIMITATIONS AND FUTURE RESEARCH

29 Although it is intended to be broadly representative of global financial  
30 markets, the MSCI Index used in this study is weighted toward large  
31 companies in developed countries. We have not taken into account the  
32 effects of many countries that adopted IFRS or a variation thereof during  
33 the past five years. Future studies can address a broader population and  
34 examine the effects of IFRS.

35

37

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## 25 APPENDIX A. EXPANDED VIEW OF FINANCIAL 27 PERFORMANCE OBJECTIVES

29 Financial Performance Objectives	Links to Financial Performance
31 Total asset management	Ability to utilize all the assets of a company in a way that maximizes revenue while minimizing investment
33 Profitability	Ability to earn a satisfactory net income
35 Financial risk	Ability to use debt effectively without jeopardizing the future of the company
37 Liquidity	Ability to generate sufficient cash to pay bills when they are due and to meet unexpected needs for cash
39 Operating asset management	Ability to utilize current assets and liabilities to support growth in revenues with minimum investment

## APPENDIX B. COMPONENTS OF THE FINANCIAL PERFORMANCE SCORECARD

Financial Performance Objectives	Performance Drivers	Performance Measures
Total asset management	Asset turnover	Growth in revenues
Profitability	Profit margin	Return on assets
Financial risk	Debt to equity	Return on equity
Liquidity	Cash flow yield	Cash flow returns
		Free cash flows
Operating asset management	Turnover ratios:	Cash cycle:
	Receivables turnover	Days' sales uncollectible
	Inventory turnover	Days' inventory on hand
	Payables turnover	Days' payable
		Financing period

## APPENDIX C. FORMULAS FOR RATIO COMPUTATIONS IN THE FINANCIAL PERFORMANCE SCORECARD

### *Performance Drivers*

$$\text{Asset turnover} = \frac{\text{Net sales}}{\text{Average total asset}}, \quad \text{Profit margin} = \frac{\text{Net income}}{\text{Net sales}}$$

$$\text{Debt to equity} = \frac{\text{Cash flows from operating activities}}{\text{Stockholder's equity}}$$

$$\text{Cash flow yield} = \frac{\text{Cash flows from operating activities}}{\text{Net income}}$$

In the analysis, if either the numerator or denominator of the cash flow yield was negative, the ratio was excluded.

*Valuation Performance Measures*

$$\text{Growth in revenues} = \frac{\text{Changes in net sales}}{\text{Net sales}},$$

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average stockholder's equity}}$$

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}}$$

$$\text{Cash flow returns} = \frac{\text{Cash flows from operating activities}}{\text{Average total assets}}$$

$$\text{Cash flow returns} = \frac{\text{Cash flows from operating activities}}{\text{Average stockholder's equity}}$$

$$\begin{aligned} \text{Free cash flow} = & \text{Cash flows from operating activities} - \text{Dividends} \\ & + \text{Sales of capital assets} - \text{Purchase of capital assets} \end{aligned}$$

In the analysis, to adjust for size of company, free cash flow was divided by average total assets.

*Operating Asset and Financing Ratios*

$$\text{Receivables turnover} = \frac{\text{Net sales}}{\text{Average accounts receivable}}$$

$$\text{Average days' sales uncollected} = \frac{365}{\text{Receivables turnover}}$$

$$\text{Inventory turnover} = \frac{\text{Cost of sales}}{\text{Average accounts inventory}}$$

$$\text{Average days' inventory on hand} = \frac{365}{\text{Inventory turnover}}$$

$$\text{Payables turnover} = \frac{\text{Cost of sales} \pm \text{Change in inventory}}{\text{Average accounts payable}}$$

$$\text{Average days' payable} = \frac{365}{\text{Payables turnover}}$$

$$\begin{aligned} \text{Financing period} = & \text{Average days' sales uncollected} \\ & + \text{Average days' inventory on hand} \\ & - \text{Average days' payable} \end{aligned}$$

#### APPENDIX D. MSCI INDEX – 2008 COMPOSITION

MSCI World Countries		MSCI World Industries	
Country	Quantity of companies	Industry group	Quantity of companies
AUS	51	13	41
AUT	10	15	31
BEL	15	16	17
CHE	26	20	67
DEU	40	26	21
DNK	16	27	26
ESP	25	28	109
FIN	21	29	23
FRA	52	32	21
GBR	107	33	33
GRC	11	34	17
HKG	28	35	91
IRL	11	36	93
ITA	18	37	54

1 **APPENDIX D. (Continued)**

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MSCI World Countries		MSCI World Industries	
Country	Quantity of companies	Industry group	Quantity of companies
JPN	316	38	62
NLD	18	44	17
NOR	21	45	18
NZL	7	48	69
PRT	8	49	79
SGP	22	50	24
SWE	34	53	17
USA	589	54	17
<b>Total</b>	1,446	56	16
		59	16
		60	31
		63	36
		67	24
		73	89
		79	16
		99	15
		Other	256
		<b>Total</b>	1,446

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**APPENDIX E. HPC BY 10-YEAR PERIOD, COUNTRY, AND INDUSTRY  
(INDUSTRIES IDENTIFIED IN APPENDIX D)**

1988–1997			1989–1998			1990–1999		
Industry group	Country	Quantity of companies	Industry group	Country	Quantity of companies	Industry group	Country	Quantity of companies
20	USA	1	20	USA	1	27	SGP	1
30	USA	1	26	USA	1	28	USA	1
37	FRA	1	27	SGP	1	35	USA	1
	USA	1	28	GBR	1	36	USA	1
37: Sub-total		2		USA	1	37	USA	1
39	JPN	1	28: Sub-total		2	38	USA	1
52	USA	1	30	USA	1	39	JPN	1
73	GBR	1	37	USA	1	48	FRA	1
	USA	3	39	JPN	1		GBR	1
73: Sub-total		4	52	USA	1	48: Sub-total		2
<b>Total</b>		10	73	GBR	2	53	USA	1
				USA	3	73	GBR	1
			73: Sub-total		5		USA	4
			<b>Total</b>		14	73: Sub-total		5
						87	GBR	1
						<b>Total</b>		16

## APPENDIX E. (Continued)

Industry group	1991–2000			1992–2001			1993–2002		
	Country	Quantity of companies	Industry group	Country	Quantity of companies	Industry group	Country	Quantity of companies	
28	FRA	1	23	USA	1	20	USA	1	
	USA	2	27	SGP	1	23	USA	1	
28: Sub-total		3	28	FRA	1	28	FRA	1	
35	USA	1		USA	2		USA	7	
36	USA	4	28: Sub-total		3	28: Sub-total		8	
37	USA	1	35	USA	2	31	FRA	1	
38	USA	2	36	SGP	1	35	USA	3	
39	USA	1		USA	3	36	SGP	1	
48	FRA	1	36: Sub-total		4		USA	4	
	GBR	1	37	USA	1	36: Sub-total		5	
48: Sub-total		2	38	USA	4	37	FRA	1	
52	USA	2	39	JPN	1		USA	1	
73	GBR	2	48	FRA	1	37: Sub-total		2	
	USA	5		GBR	1	38	USA	3	
73: Sub-total		7	48: Sub-total		2	48	GBR	1	



APPENDIX E. (Continued)

Industry group	1994-2003			1995-2004			Quantity of companies
	Country	Quantity of companies	Industry group	Country	Industry group	Quantity of companies	
23	FRA	1	15	USA		1	
	USA	1	27	USA		1	
23: Sub-total			2	USA		3	
27	USA	1	30	USA		1	
28	FRA	1	31	FRA		1	
	USA	6	35	ESP		1	
28: Sub-total			7	USA		3	
31	FRA		35: Sub-total			4	
35	ESP	1	36	SGP		1	
	USA	3		USA		4	
35: Sub-total			4			5	
36	FIN	1	37	USA		1	
	SGP	1	38	DNK		1	
	USA	4		GBR		1	
36: Sub-total			6	USA		4	

37	USA		1	38: Sub-total				6
38	GBR	1		39	USA			1
	USA	3		44	USA			1
38: Sub-total			4	47	USA			1
39	USA		1	48	GBR			1
48	GBR		1	50	USA			1
50	USA		1	51	USA			1
52	USA		1	52	GBR		1	
53	USA		1		USA		1	
56	GBR		1	52: Sub-total				2
57	USA		1	53	USA			1
59	USA		1	56	GBR			1
73	CHE	1		57	USA			1
	DEU	1		73	DEU		1	
	GBR	2			GBR		1	
	USA	5			SWE		1	
73: Sub-total			9		USA		7	
87	GBR	1		73: Sub-total				10
	USA	1		87	GBR		1	
87: Sub-total			2		USA		1	
<b>Total</b>			45	87: Sub-total				2
				<b>Total</b>				46

## APPENDIX E. (Continued)

Industry group	1996-2005			1997-2006			1998-2007		
	Country	Quantity of companies	Industry group	Country	Quantity of companies	Industry group	Country	Quantity of companies	
15	USA	2	15	GBR	1	15	GBR	2	
20	USA	1		USA	1		USA	1	
27	USA	1	15: Sub-total			2		3	
28	FRA	1	20	USA		2	CHE	1	
	USA	2	21	GBR		1	USA	1	
28: Sub-total		3	23	USA		1		2	
30	USA	1	27	USA		1	GBR	1	
34	IRL	1	28	USA		2	USA	5	
35	ESP	1	34	IRL		1	FRA	1	
	USA	4	35	USA		2	CHE	1	
35: Sub-total		5	36	USA		4	IRL	1	
36	FIN	1	37	USA		1		2	
	USA	3	38	AUS		1	FIN	1	
36: Sub-total		4		DNK		1	USA	4	
37	USA	1		JPN		1		5	
							36: Sub-total		


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38		DNK	1			USA	6		37		USA		4
		JPN	1		38: Sub-total			9	38		AUS	1	
		USA	8			USA		1			CHE	1	
				10		USA		1			DNK	1	
38: Sub-total						USA		1			GBR	1	
39		USA	1	1	50	USA		1			JPN	1	
44		USA	1	1	51	USA		1			USA	7	
47		USA	1	1	52	GBR	1						
48		GBR	1	1		USA	1		38: Sub-total				12
50		USA	1	1	52: Sub-total			2	39		USA		1
51		GBR	1		53	USA		4	47		USA		1
		USA	3		54	BEL		1	49		USA		1
51: Sub-total				4	55	USA		1	50		HKG	1	
52		GBR	1		56	GBR	1				USA	1	
		USA	1			SWE	1		50: Sub-total				2
52: Sub-total				2		USA	1		51		GBR	1	
53		USA		2	56: Sub-total			3			USA	2	
56		GBR	1		57	USA		1	51: Sub-total				3
		SWE	1		73	GBR	1		52		USA		1
		USA	1			USA	7		53		USA		1

## APPENDIX E. (Continued)

1996-2005			1997-2006			1998-2007		
Industry group	Country	Quantity of companies	Industry group	Country	Quantity of companies	Industry group	Country	Quantity of companies
56: Sub-total		3	73: Sub-total		8	54	BEL	1
57	USA	1	87	GBR	1	55	USA	1
73	GBR	1		USA	1	56	GBR	1
	USA	8	87: Sub-total		2		SWE	1
73: Sub-total		9	<b>Total</b>		52		USA	1
87	GBR	1				56: Sub-total		3
	USA	1				57	USA	2
87: Sub-total		2				73	USA	5
<b>Total</b>		57				87	GBR	1
							USA	1
						87: Sub-total		2
						<b>Total</b>		59

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