

An Empirical study of the Financial Ratios of the Indian Information Technology Sector by applying Factor Analysis and substantiation of the results using Cluster Analysis

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Abstract

Financial Ratios play an important role in analysing the performance of a company. The current study based on the empirical data collected, financial ratios are reduced and categorised for the Information Technology sector. Fifty ratios grouped into five categories are calculated for ten years covering eighty eight percent of the market capitalisation of the sector, being an effective representative sample. Initially variables with low correlation are eliminated. Factor Analysis is conducted on the remaining variables which led to eight factors. Multiple Regression Analysis is conducted by taking the factor scores as dependent variable and the constituent ratios as independent variables. Insignificant variables identified through the analysis are eliminated. Factor Analysis is conducted on the remaining eighteen variables which lead to five factors. It aids in understanding the integration of mission, quality of management along with various stakeholders perception.

I. Introduction

FINANCIAL RATIOS ARE an important tool to interpret and analyse financial statements. They help in understanding the financial performance and position of an organisation. It aids in undertaking the evaluation of the business for particular time period and facilitates in understanding the integration of the mission, vision, quality of management along with various stakeholders perceptions.

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Appendix A
List of Financial Ratios

Group	Ratio Code	Ratio
Profitability & Efficiency	P_R1	Pre-Tax Profit Margin
Profitability & Efficiency	P_R2	Post-Tax Profit Margin
Profitability & Efficiency	P_R3	Return on Equity Ratio
Profitability & Efficiency	P_R4	Return on Assets Ratio
Profitability & Efficiency	P_R5	Return on Capital Employed Ratio
Profitability & Efficiency	P_R6	Return on Average Equity Ratio
Profitability & Efficiency	P_R7	Return on Average Capital Employed Ratio
Profitability & Efficiency	P_R8	Equity Div. Distribution Ratio
Profitability & Efficiency	P_R9	Total Div. Distribution Ratio
Profitability & Efficiency	P_R10	Return on Average Assets Ratio
Profitability & Efficiency	P_R11	Sales to Employees Expenses
Profitability & Efficiency	P_R12	Sales to Administrative Expenses
Liquidity & Cash Flow	LC_R13	Current Ratio
Liquidity & Cash Flow	LC_R14	Quick Ratio
Liquidity & Cash Flow	LC_R15	Net Working Capital Ratio
Liquidity & Cash Flow	LC_R16	Cash flow from operations to Total Income
Liquidity & Cash Flow	LC_R17	Cash flow from operations to Total Assets
Liquidity & Cash Flow	LC_R18	Cash flow from operations to Equity
Liquidity & Cash Flow	LC_R19	Cash flow from operations to Capital Employed
Liquidity & Cash Flow	LC_R20	Cash flow from operations to Net working Capital
Liquidity & Cash Flow	LC_R21	Cash flow from operations to Average Total Assets
Liquidity & Cash Flow	LC_R22	Cash flow from operations to Average Equity
Liquidity & Cash Flow	LC_R23	Cash flow from operations to Average Capital Employed
Liquidity & Cash Flow	LC_R24	Cash flow from operations to Current Liabilities
Liquidity & Cash Flow	LC_R25	Cash flow from operations to Current Assets
Liquidity & Cash Flow	LC_R26	Cash flow from operations to Sales Ratio
Liquidity & Cash Flow	LC_R27	Cash flow from operations to Total Assets
Solvency	S_R28	Interest Coverage Ratio
Solvency	S_R29	Debt/Equity Ratio
Solvency	S_R30	Dividend Coverage Ratio
Solvency	S_R31	Long Term Debt to Capital Employed
Solvency	S_R32	Net Worth to Capital Employed
Solvency	S_R33	Capital Gearing Ratio
Solvency	S_R34	Total Debt to Total Assets
Solvency	S_R35	Total Debt to Turnover
Assets Management	AM_R36	Fixed Assets Turnover
Assets Management	AM_R37	Average Fixed Assets Turnover
Assets Management	AM_R38	Working Capital Turnover
Assets Management	AM_R39	Debtors Turnover Ratio
Assets Management	AM_R40	Total Income to Capital Employed
Assets Management	AM_R41	Working Capital to Total Assets
Assets Management	AM_R42	Total Assets Turnover
Market & Valuation	MV_R43	Price Earnings Ratio
Market & Valuation	MV_R44	Enterprise Value to EBIT
Market & Valuation	MV_R45	Enterprise Value to Assets
Market & Valuation	MV_R46	Enterprise Value to Cash From Operations
Market & Valuation	MV_R47	Enterprise Value to Sales
Market & Valuation	MV_R48	Price Sales Ratio
Market & Valuation	MV_R49	Price-Cash Ratio
Market & Valuation	MV_R50	Price-Book Value Ratio

Appendix B
Results of Factor Analysis

	Rotated Component Matrixa							
	1	2	3	4	5	6	7	8
P_R3	.927925	.257433	.108077	.054894	.079122	.097399	.045332	.051178
P_R6	.927243	.249486	.120840	.043477	.057545	.059656	.016202	.038726
P_R7	.885058	.288957	.019332	.238218	.072451	.009469	.005161	.107405
P_R5	.871647	.235828	.022900	.269967	.080024	.148134	.016128	.183542
P_R10	.840455	.305680	.164700	.279326	.090336	.188385	.026747	.075215
AM_R42	.820693	.213173	.452029	.098527	.083810	.056152	.012355	.002801
P_R4	.794213	.316978	.206199	.327906	.080379	.212613	.060407	.156466
AM_R40	.785274	.085168	.519659	.085715	.193955	.114002	.042931	.035228
MV_R46	.698919	.416373	.043630	.108581	.009098	.244645	.340309	.232442
MV_R49	.695215	.419391	.041430	.100807	.002367	.241035	.352893	.230353
MV_R43	.605947	.437044	.020050	.021709	.050496	.482474	.253577	.273209
LC_R21	.215448	.957050	.001209	.059438	.107052	.011064	.009449	.007933
LC_R17	.205482	.955562	.018641	.103141	.103400	.003933	.026193	.046045
LC_R18	.170305	.944418	.171994	.113582	.034846	.061164	.003397	.082029
LC_R19	.217105	.942582	.124209	.107633	.011397	.038747	.017761	.089007
LC_R23	.234218	.939783	.106036	.056158	.008626	.146781	.012453	.002460
LC_R22	.198643	.936587	.171515	.120765	.016185	.098940	.024132	.011430
LC_R16	.185800	.782648	.463201	.001899	.140108	.075431	.099647	.041891
LC_R20	.165170	.569317	.452311	.151445	.196562	.083730	.532815	.007593
LC_R14	.208529	.143035	.897409	.161549	.112178	.055879	.007886	.120270
LC_R13	.211717	.145226	.896914	.153027	.113397	.056812	.012649	.119584
LC_R41	.141562	.180260	.854796	.314714	.125149	.035808	.077770	.112187
P_R1	.095146	.078288	.836769	.278360	.087026	.066342	.044352	.226862
LC_R15	.068667	.123182	.811337	.321684	.322504	.078644	.228249	.109316
P_R2	.196433	.164015	.810303	.267150	.119986	.278049	.102115	.059205
AM_R38	.014403	.031426	.608495	.149154	.253992	.123293	.589247	.007194
S_R34	.150446	.015123	.223220	.924196	.078792	.146003	.017203	.52558
S_R29	.152442	.018652	.222560	.924059	.075835	.146568	.015161	.053417
S_R35	.169736	.018374	.254703	.918077	.075596	.131543	.006520	.052137
S_R32	.174267	.010038	.265881	.915132	.088439	.142179	.004283	.052105
S_R31	.177013	.014980	.264894	.915013	.084277	.143060	.007084	.053278
S_R33	.255802	.007237	.480462	.569173	.122781	.009388	.504903	.126683
LC_R25	.059663	.078867	.065009	.055954	.978324	.006884	.012866	.076509
LC_R27	.030544	.048376	.142481	.110402	.972702	.003310	.052096	.073645
LC_R26	.118194	.032762	.230988	.101492	.946179	.27288	.049173	.054287
LC_R24	.045589	.041253	.291574	.107947	.922623	.062496	.004581	.045075
MV_R44	.066287	.184443	.01881	.123025	.007375	.882863	.176066	.227415
MV_R47	.095537	.066089	.463307	.210459	.035808	.838547	.086309	.019030
MV_R48	.069752	.056830	.465161	.245564	.113957	.826450	.031474	.022449
MV_R45	.572175	.017463	.081182	.174315	.022833	.770989	.005965	.013609
MV_R50	.661421	.025378	.056768	.094491	.013347	.718662	.077840	.035106
MV_R36	.325502	.040544	.138885	.503249	.69781	.215089	.598562	.274501
MV_R37	.383294	.003958	.202836	.459247	.035755	.192446	.552455	.242662
MV_R39	.043381	.099343	.048324	.092870	.548475	.060201	.037161	.673492
P_R11	.149766	.152408	.081057	.170206	.158239	.287780	.277991	.666970

Appendix C Results of Multiple Regressions

1. Multiple Regression Analysis on Factor 1

Model		Coefficients				Sig.
		Unstandardized Coefficients		Standardized Coefficients	t	
		B	Std. Error	Beta		
1	(Constant)	-2.381	.145	-16.397	.000	
	P_R3	10.341	2.516	1.097	4.110	.000
	P_R6	-3.862	2.053	-.500	-1.882	.066
	P_R7	4.302	1.070	.589	4.023	.000
	P_R5	-12.165	2.546	-1.528	-4.778	.000
	P_R10	-1.821	2.851	-.174	-.639	.526
	P_R4	13.051	4.403	1.082	2.964	.005
	AM_R42	-1.854	.812	-.516	-2.284	.027
	AM_R40	1.644	.530	.834	3.105	.003
	AM_R46	.017	.020	1.063	.816	.419
	AM_R49	-.009	.020	-.581	-.451	.654
	AM_R43	-.005	.004	-.092	-1.208	.233

2. Multiple Regression Analysis on Factor 2

Model		Coefficients				Sig.
		Unstandardized Coefficients		Standardized Coefficients	t	
		B	Std. Error	Beta		
1	(Constant)	-2.482	.071		-34.761	.000
	LC_R17	6.530	3.967	.457	1.646	.106
	LC_R18	1.809	2.280	.189	.793	.431
	LC_R19	-1.431	1.314	-.144	-.619	.539
	LC_R20	.273	.076	.120	3.583	.001
	LC_R21	-.304	3.149	-.025	-.097	.923
	LC_R22	1.315	2.060	.164	.638	.526
	LC_R16	3.943	.717	.236	5.498	.000
	LC_R23	1.003	1.584	.117	.725	.427

3. Multiple Regression Analysis on Factor 3

Model		Coefficients				Sig.
		Unstandardized Coefficients		Standardized Coefficients	t	
		B	Std. Error	Beta		
1	(Constant)	-1.477	.408		-3.617	.001
	P_R2	4.028	3.002	.226	1.342	.185
	P_R1	2.473	2.221	.199	1.113	.271
	LC_R13	.209	1.889	.355	.111	.912
	LC_R14	.245	1.918	.418	.128	.899
	LC_R15	-3.166	1.029	-.524	-3.077	.003
	AM_R41	.125	.119	.170	1.051	.298
	AM_R38	-.079	.032	-.231	-2.455	.017

4. Multiple Regression Analysis on Factor 4

Model		Coefficients		t	Sig.
		Unstandardized Coefficients B	Std. Error		
1	(Constant)	-1.775	32.918	.054	.957
	S_R31	14.214	33.802	1.298	.676
	S_R32	-1.179	32.904	-.108	.972
	S_R33	-.546	.475	-.072	.255
	S_R35	-18.516	13.574	-1.184	.177
	S_R29	-8.442	3.435	-1.105	.017

Excluded Variables^b

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance	
1	S_R34	20.651	.092	.927	.013	.000

5. Multiple Regression Analysis on Factor 5

Model		Coefficients		t	Sig.
		Unstandardized Coefficients B	Std. Error		
1	(Constant)	-1.057	.046	-22.745	.000
	LC_R24	.038	.119	.032	.753
	LC_R25	3.318	.909	.692	.001
	LC_R26	-1.012	.916	-.172	.274
	LC_R27	2.735	1.885	.427	.153

6. Multiple Regression Analysis on Factor 6

Model		Coefficients		t	Sig.
		Unstandardized Coefficients B	Std. Error		
1	(Constant)	2.401	.169	-14.239	.000
	MV_R44	.092	.016	5.855	.000
	MV_R45	-.332	.143	-2.323	.024
	MV_R47	-.037	.274	-.068	.893
	MV_R48	.288	.256	.534	.265
	MV_R50	.239	.082	2.916	.005

7. Multiple Regression Analysis on Factor 7

Model		Coefficients		t	Sig.
		Unstandardized Coefficients B	Std. Error		
1	(Constant)	-1.650	.310	-5.315	.000
	AM_R36	.459	.206	.763	.029
	AM_R37	-.091	.180	-.173	.614

8. Multiple Regression Analysis on Factor 8

Model		Coefficients ^a		t	Sig.
		Unstandardized Coefficients B	Std. Error		
1	(Constant)	-1.593	.666	-2.392	.020
	AM_R39	.460	.099	4.644	.000
	P_R11	-.366	.081	-4.509	.000

Appendix D
Rotated Component matrix

	Component				
	1	2	3	4	5
P_R7	.95755	-.02747	.06093	.02125	.04740
P_R5	.95347	-.03736	.17475	.05077	.07372
P_R3	.91233	.09533	.22200	.05979	-.05217
P_R4	.86885	-.26726	.23923	.13204	.22357
AM_R42	.85930	.28476	.09241	.01377	-.25204
AM_R40	.82583	.36333	.00824	-.05321	-.33825
AM_R36	.62130	.06719	-.37304	-.11055	.10082
LC_R15	-.13040	-.91866	.06622	.04564	.24048
AM_R38	.12914	.86259	-.18091	-.15929	-.04668
LC_R20	.04358	.85019	-.17789	-.06689	.43044
S_R29	-.40604	.56552	-.00710	.21686	-.33704
MV_R44	-.0764	-.20079	.90821	-.18504	-.07208
MV_R45	.53502	-.16683	.79084	.01176	.08150
MV_R50	.60747	-.01376	.74936	.02655	-.01022
AM_R39	.05332	-.00752	.00059	.89908	.01759
LC_R25	-.09899	-.31577	.01965	.69720	.12877
P_R11	-.20999	-.18827	.40445	-.63052	-.15315
LC_R16	-.05699	-.07628	-.03423	.22712	.90071

Appendix E
Rotated Component matrix

	Component		
	1	2	3
P_R7	.973	-.010	.072
P_R5	.953	-.020	.199
P_R3	.951	.087	.191
P_R4	.883	-.274	.237
AM_R42	.859	.342	.122
AM_R40	.809	.441	.067
AM_R38	.042	.933	-.077
LC_R15	-.110	-.932	.057
LC_R20	.004	.832	-.177
MV_R44	-.080	-.171	.948
MV_R45	.486	-.167	.839
MV_R50	.556	-.008	.806

Appendix F
Cluster Membership

Case	3 Clusters
P_R5	1
P_R3	1
P_R4	1
P_R7	1
AM_R38	2
AM_R40	1
AM_R42	1
LC_R15	3
LC_R20	2
MV_R44	3
MV_R45	3
MV_R50	3