Volume 10
Number 1
Spring 2012

ISSN 1854-6935

Managing Global Transitions

EDITOR
Mitja Ruzzier

International Research Journal

Managing Global Transitions
International Research Journal

EDITORIAL OFFICE

University of Primorska
Faculty of Management Koper
Cankarjeva 5, SI-6104 Koper, Slovenia
Phone: ++386 (0) 5 610 2021
E-mail: mgt@fm-kp.si
www.mgt.fm-kp.si

Managing Editor: Alen Ježovnik
Editorial Assistant: Tina Andrejašič
Copy Editor: Alan McConnell-Duff
Cover Design: Studio Marketing JWT
Text Design and Typesetting: Alen Ježovnik

Managing Global Transitions
International Research Journal

VOLUME 10 · NUMBER 1 · SPRING 2012 · ISSN 1854-6935

Table of Contents

Does Technology Lead to Better Financial Performance? A Study of Indian Commercial Banks

Dhiraj Sharma

It has been a matter of debate whether Technology provides better financial results and improves productivity. The present paper attempts to study the inter-group comparison of financial performance of Indian banks by classifying the banks on the basis of usage of Technology. Further, for the purpose of temporal comparison, the period for the study has been divided into two parts, i. e. low technology induction period and high technology induction period. Findings of the paper show that the fully IT oriented banks are financially better off than the partially IT oriented banks. Moreover, the performance of almost all the banks under study has tremendously improved in the high technology induction period. However, for the Indian banking industry, the correlation between Technology induction and financial productivity is negative though statistically insignificant and low.

Key Words: IT productivity paradox, information technology, financial performance, indian banks, spread and burden ratios

JEL *Classification:* O33, G21, M15

Introduction

For decades, it has been a matter of debate whether Technology/Information Technology (IT) provides better financial results. To date there is no conclusive evidence that spending on IT improves financial performance. The scholars call it the 'IT Productivity Paradox.' The term 'paradox' indicates a negative correlation between IT investments and productivity. Morrison and Berndt (1990) found that additional IT investments contributed negatively to financial productivity. They concluded that the estimated marginal benefits of investment in IT are less than the estimated marginal costs. On similar lines, studies by Strassman (1990) and Dos Santos, Peffers and Mauer (1993) have also concluded that there is an insignificant correlation between IT spending and profitability measures, which means IT spending is unproductive.

Dr Dhiraj Sharma is an Assistant Professor at the School of Management Studies, Punjabi University, India.

Managing Global Transitions 10 (1): 3–28

There are, on the other hand, studies which show that there is no correlation between IT investment and financial productivity (Loveman 1994; Barua et al. 1991). Jordan and Katz (1999) found that even the most successful banks offering Internet banking were able to serve only a relatively small share of their customer base with IT channels. Thus, it was difficult to determine whether Internet banking has a significant impact on bank performance. And there are studies which have found significant contributions from IT toward financial growth (Lichtenberg 1995; Brynjolfsson and Hitt 1996). Most of these firm-level studies have been restricted to the manufacturing sector (that too, outside India), in large part owing to lack of firm-level data from the service sector.

There are studies which have drawn on the statistical correlation between IT spending and profitability or stock value for their analyses and they have concluded that the impact of IT on productivity is positive ((Brynjolfsson 1993; Wilson 1993). It is apparent that most of the studies relating to the contribution of IT towards productivity have been restricted to the manufacturing industry. The problem is particularly relevant to the banking industry, which is the focus of the present study. In India, there are not many studies that have focused on IT contribution in the banking sector. Mariappan (2006) found that the IT revolution has brought stunning changes in the business environment. No other sector has been influenced by advances in technology as much as banking and finance, as a result, the Indian banking has a totally new face today. Similarly, Kamakodi (2007) examines how computerization has influenced the banking habits and preferences of Indian bank customers and what factors influence these preferences. He found that change of residence, salary account and non-availability of the technology based services were the three main reasons for shifting to another bank. Further in the technology direction, Patnaik (2004) found that shared ATMs are taking place and they are mutually beneficial. This mushrooming new dimension of shared ATMs has increased the non-interest income of the banks. This is the most popular e-channel and widely used in all the bank groups. Paul and Mukherjee (2007) explained that cash management in ATMs is a new concept which facilitates the banks to source cheaper funds and serve its clients more efficiently.

Many studies have also highlighted the importance of customer satisfaction and the management of customer relations in the success of banking business (Singh 2004; Krishnaveni, Prabha and Divya 2006; Mishra and Jain 2007; Raveendra 2007; Sharma, Kaur and Sharma 2007;

Sharma and Dhanda 2007; Singh and Kabirai 2007; Thakur 2007; Uppal and Kaur 2007; Uppal 2008; Vanniarajan and Nathan 2008). The process of economic liberalization and financial sector reforms has underlined the importance of customer-focus by the banks (Shanker 2004). The main bottlenecks to the superior services are the untrained human resource and the lagging technology (Thakur 2007).

Yet, there have been a number of studies which have focused on the financial performance and efficiency of the banks in the recent past. The studies reveal that the profitability of Indian banks has increased since the second generation banking reforms and, among the several bank groups, the foreign and private sector banks are performing well as compared to the public and nationalized banks in India (Sarkar, Sarkar and Bhaumik 1998; Muniappan 2002; Sooden and Bali 2004; Aggarwal 2005; Arora and Verma 2005; Bhaskar 2005; Madhavankutty 2007; Uppal and Kaur 2007; Kumar and Sreeramulu 2008).

Another significant area which has emerged recently and been explored by the researchers is that of risk management in the banks. Madhavankutty (2007) concludes that the banking system in India has attained enough maturity and is ready to address prudential management practices as comprehensively as possible. Similarly, Mohan (2003) highlights the need for each bank to have in place the technical systems and managements processes necessary not only to identify the risks associated with its activities, but also to effectively measure, monitor and control NPA (Non Performing Asset) levels. While operations, capital and risk management, technological innovations and customer satisfaction will be the drivers of growth, it is going to be the corporate governance which will lead Indian banking to match best business practices on the global level (Aggarwal 2007; Lal 2007). Padwal (2004) stresses the need of integrating business development planning with a clear IT/IS road map. Malhotra and Singh (2005) describe the key risks associated with the adoption of banking technology. IT allows the banking industry to establish a direct link to the customers. Similarly, Habbar (2004) emphasizes that managing technology is a key challenge for the Indian banking industry. Banks have enhanced their networks and communication infrastructure to reap the full benefits of computerization. E-banking is fast catching up. There is a great need for trust, privacy and confidentiality. Only sound corporate governance would lead to effective and meaningful banking (Lakhsmi Naraynan 2004). Narayanasami (2005) states that Indian banking is in a better position with respect to technology, capital

adequacy, credit management, risk bearing capacity, international competitiveness and contribution to the national economy. For global competition, Indian banks will have to gear up to meet stringent prudential capital adequacy norms under Basel I and II accords (Subbaroo 2007).

OBJECTIVES AND SCOPE OF THE STUDY

The specific objective of the present paper is to study the inter-group comparison of the financial performance of Indian commercial banks by classifying the banks on the basis of usage of Technology. The study of the financial performance of banks has been carried out from the year 1996 to the year 2008. The total time period for the study has been divided into two periods: Low Technology Induction Period and High Technology Induction Period. The period from the years 1997–1998 to 2000–2001 has been taken as India's Low-technology Era while the High-technology Era is considered to have been be effectively started from 2001 afterwards. During the period 1996–1997 to 2000–2001, the technological applications in the Indian banking sector were not very developed and mature. Moreover, new private sector banks started entering the Indian banking industry in a big way from the year 1996. The technological boost only came after the implementation of the IT Act. The Indian government gave its assent to the Act in October 2000 but the Information Technology Act, which is a comprehensive legislation for IT applications in the business, became effective only after 2001. The Act has brought the structure, legal validity and authenticity for transacting and making payments online. Hence, the period after 2001 has been termed as the High Technology Induction Period. Another reason for assuming such a period as the High Technology Period is that in India e-banking services started in full-swing only from 2001 onwards.

RESEARCH METHODOLOGY

The financial performance of a bank can be measured in a number of ways. The Operational Profitability is the most widely used indicator to judge the financial position of a business. For measuring the profitability of commercial banks, various banking and financial ratios have been computed. To measure the extent of a technology induction quantitatively, technology index was formulated for each bank group. An average figure based on ATMs, Fully Computerised Branches, Internet Banking Branches, Mobile Banking Branches and Tele-banking Branches for each bank for each year starting from 1996–1997 till 2007–2008 has been com-

puted and averaged for each bank group. The numbers so arrived at represent, in percentage as a score, the extent of technology induction for each bank group.

Thus, Technology Index of a Bank = [(Number of ATMs/Total Branches) + (Number of Fully Computerised Branches/Total Branches) + (Number of Internet Banking Branches/Total Branches) + (Number of Mobile Banking Branches/Total Branches) + (Number of Tele-Banking Branches/Total Branches)] × 100.

SAMPLE DESIGN AND SAMPLE UNIT

On the basis of usage of technology RBI (Reserve Bank of India – India's Central Bank) recognizes different bank groups as 'Partially IT-oriented Banks' or 'Fully IT-oriented Banks.' 'Fully IT-oriented Banks' are 100 per cent automated banks that are providing their customers with access to all the technological channels, such as ATMs, Credit Cards, E-banking, Mobile Banking etc., whereas 'Partially IT-oriented Banks' are those banks which are still in the process of automation and are not providing their customers with all the technological channels to perform banking operations. The four major bank groups relevant for the study are outlined as below.

- Partially IT-oriented Banks: Group I – Public Sector Banks (excluding State Bank of India and its Associates) (20 Banks); Group II – State Bank of India and its 7 Associates (08 Banks)
- Fully IT-oriented Banks: Group III – Private Sector Banks (25 Banks); Group IV – Foreign Banks (29 Banks)

From each group of banks, the top five banks (in terms of highest business per employee in the year 2007) have been taken as the sample for the present study. Table 1 shows the selected bank groups for the present study on the basis of usage of technology.

Results and Discussion

The study uses Ratio analysis to compare profitability and productivity of different categories of banks. The following is the analysis of major ratios that have been employed for assessing the financial performance of the banks under study.

SPREAD RATIOS ANALYSIS

Spread, which is the difference between interests earned (on loans and advances) and interest paid (on deposits and borrowings) by the banks,

TABLE 1 Selected Bank Groups on the basis of usage of technology

Partially IT-oriented Banks		Fully IT-oriented Banks	
Group I Public Sector Banks	Group II State Bank of India and Associates	Group III Private Sector Banks	Group IV Foreign Banks
Punjab National-Bank (PNB)	State Bank of India (SBI)	HDFC Bank	Standard Chartered Bank
Canara Bank (CB)	State Bank of Hyderabad (SBOH)	ICICI Bank	Citi Bank
Bank of India (BOI)	State Bank of Patiala (SBOP)	UTI Bank (Now Axis Bank)	HSBC Bank
Union Bank of India (UBI)	State Bank of Travancore (SBOT)	Jammu & Kashmir Bank	ABN Amro Bank
Bank of Baroda (BOB)	State Bank of Bikaner & Jaipur (SBOBJ)	Federal Bank	Deutsche Bank

plays a major role in determining the operational profitability of banks. Table 2 reveals the Spread Ratios of the Indian Commercial Banks. Interest rates in Indian banking sector has declined from the low to high technology period.

Thus, the spread of banks have declined because of lower interest rates in the recent years. In the low-technology era, the maximum average interest earned as a percentage of average assets was 9.74% in the case of Group IV banks, and in the high-technology era, the maximum average interest earned as a percentage of average assets was 7.62% in the case of Group II banks.

In the low technology era, the maximum average spread as a percentage of average assets was 3.43% in the case of Group IV (foreign) banks, and in the high-technology era the maximum average spread as a percentage of average assets was 3.34% again in the case of Group IV banks. Overall, the *t*-test exhibits insignificant difference in the means of the two periods for the Indian banking industry.

BURDEN RATIOS ANALYSIS

Burden is defined as the difference between non-interest expenditure and non-interest income of the banks. Burden is usually taken in the negative sense since non-interest expenses tend to exceed non-interest income in the banking industry.

TABLE 2 Spread Ratios of Indian commercial banks

Group	Average	Spread Ratios		
		IE%AAS	IP%AAS	S%AAS
Group I	X_1	9.24	6.36	2.87
	X_2	7.30	4.44	2.85
	Mean Gap	1.94	1.92	0.02
	SE	0.80	0.75	0.19
	t-value	3.89	4.09	0.13
	LOS	**	**	—
Group II	X_1	8.90	6.01	2.91
	X_2	7.62	4.59	3.04
	Mean Gap	1.28	1.41	0.13
	SE	0.58	0.68	0.28
	t-value	3.50	3.30	0.72
	LOS	**	**	—

Continued on the next page

Table 3 reveals the Burden Ratios of Indian Commercial Banks. Like the Spread, the average burden has also decreased from 2.14% to 1.81 % for the Indian banking industry. In the low-technology era, the maximum Burden as a % of Average Total Assets was 2.80% in the case of Group IV banks, and the minimum average Burden as a% of Average Assets was 0.99% in the case of Group III banks. In the high-technology era, the maximum Burden as a Percentage of Average Assets was 2.18% in the case of Group II banks, and the minimum Burden as a Percentage of Average Assets was 1.06% in the case of Group III banks. There is a decline in the Burden as a Percentage of Average Assets of Indian banks, which is a positive sign. Overall, the *t*-test exhibits significant difference in the means of the two periods at 1 % LOS for the Indian banking industry.

PROFITABILITY RATIOS ANALYSIS

Profitability ratios measure the bank's use of its assets and control of its expenses to generate an acceptable rate of return. In other words, profitability ratios reveal the operational profitability of the banks under study. As per table 4, the profits of Indian banks have increased significantly from the low technology era to the high technology era.

TABLE 2 *Continued from the previous page*

Group	Average	Spread Ratios		
		IE%AAS	IP%AAS	S%AAS
Group III	X_1	8.69	6.59	2.08
	X_2	6.25	4.12	2.11
	Mean Gap	2.44	2.47	0.03
	SE	1.09	1.04	0.49
	t-value	3.58	3.77	0.09
	LOS	**	**	—
Group IV	X_1	9.74	6.31	3.43
	X_2	6.69	3.34	3.34
	Mean Gap	3.05	2.97	0.09
	SE	1.00	1.11	0.54
	t-value	4.88	4.27	0.27
	LOS	**	**	—
Banking Industry Average	X_1	9.14	6.31	2.83
	X_2	6.96	4.12	2.81
	Mean Gap	2.17	2.19	0.02
	SE	0.71	0.75	0.11
	t-value	4.40	4.03	0.77
	LOS	**	**	—

NOTES IE%AAS – Interest Earned as percent of Average Assets, IP%AAS – Interest Paid as percent of Average Assets, S%AAS – Spread as percent of Average Assets, X_1 – Average in Low-technology induction period, X_2 – Average in High-technology induction period, SE – Standard Error, LOS – Level of Significance; * mean is significant at the 0.05 level, ** mean is significant at the 0.01 level. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

The *t*-test exhibits significant difference in the means of two periods at 1 % LOS for the Indian banking industry. When we compare profits to average assets, the winners again are Foreign banks. The analysis of Average Profitability Gap among various bank groups indicates that there is little change in Group I to Group III banks, but there is a huge change in Group IV banks (Foreign Banks).

Technology and Financial Performance

This section highlights the impact of technology and its various channels on banks' performance and productivity.

TABLE 3 Burden Ratios of Indian commercial banks

Group	Average	Burden Ratios		
		NIE%AAS	NII%AAS	B%AAS
Group I	X_1	3.55	1.07	2.48
	X_2	3.24	1.25	1.99
	Mean Gap	0.31	0.18	0.49
	SE	0.41	0.39	0.15
	t-value	1.22	0.73	5.28
	LOS	—	—	**
Group II	X_1	3.68	1.37	2.31
	X_2	3.58	1.40	2.18
	Mean Gap	0.10	0.03	0.13
	SE	0.20	0.32	0.35
	t-value	0.80	0.14	0.60
	LOS	—	—	—

Continued on the next page

FULLY COMPUTERIZED BRANCHES AS A PERCENTAGE OF TOTAL BRANCHES

The ratio of computerized branches as a Percentage of total branches in the new private sector and foreign banks is 100 % in both the Low-technology induction period and the High-technology induction period (table 5).

But this ratio was lowest in the case of Group I banks in the low technology era, i. e. 18.16%; however this ratio increased to 81.42% on an average at the end of the high technology period. In the case of SBI group banks this ratio increased to 97.14% from 76.75% average in the Low-technology induction period. In the high-technology induction period this ratio is more consistent in Group II banks (where CV is only 2.67 %).

ATMS AS A PERCENTAGE OF TOTAL BRANCHES

ATM is the most popular e-channel and the maximum bank customers use this e-channel. The ratio of ATMS as a Percentage of Total Branches increased very sharply in all the bank groups in the high-technology induction period (table 6). In the high-technology induction period this ratio is more consistent in Group I banks (where CV is only 11.90 %). However, the maximum rise is observed in Group IV banks and similar

TABLE 3 *Continued from the previous page*

Group	Average	Burden Ratios		
		NIE%AAS	NII%AAS	B%AAS
Group III	X_1	2.71	1.73	0.99
	X_2	2.92	1.86	1.06
	Mean Gap	0.21	0.13	0.07
	SE	0.42	0.43	0.26
	t-value	0.78	0.50	0.45
	LOS	—	—	—
Group IV	X_1	5.39	2.59	2.80
	X_2	4.79	2.77	2.02
	Mean Gap	0.60	0.18	0.79
	SE	0.35	0.21	0.22
	t-value	2.72	1.34	5.69
	LOS	*	—	**
Banking Industry Average	X_1	3.83	1.69	2.14
	X_2	3.63	1.82	1.81
	Mean Gap	0.20	0.13	0.33
	SE	0.16	0.23	0.11
	t-value	1.73	1.27	4.95
	LOS	—	—	**

NOTES NIE%AAS – Non-Interest Expenditure as percent of Average Assets, NII%AAS – Non-Interest Income as percent of Average Assets, B%AAS – Burden as percent of Average Assets, X_1 – Average in Low-technology induction period, X_2 – Average in High-technology induction period, SE – Standard Error, LOS Level of Significance; * mean is significant at the 0.05 level, ** mean is significant at the 0.01 level. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

is the case of Group III banks. Overall, in the Indian Banking Industry, this ratio has increased from average 44.82% in the low-technology induction period to 82.63 % in the High-technology induction period.

INTERNET BANKING BRANCHES AS A PERCENTAGE OF TOTAL BRANCHES

In India, after ATMs, Internet banking is the biggest and most popular technological channel for banking operations. This ratio represents the extent of branches providing internet banking services.

Table 7 shows that Group III banks have an average of 36.64 pc against

TABLE 4 Profitability Ratios of Indian commercial banks

Group	Average	Profitability Ratios		
		NP%TI	NP%TD	NP%AAS
Group I	X_1	3.75	0.44	0.39
	X_2	10.21	1.01	0.86
	Mean Gap	6.46	0.57	0.48
	SE	1.49	0.16	0.14
	t-value	6.93	5.67	5.29
	LOS	**	**	**
Group II	X_1	5.86	0.77	0.60
	X_2	9.50	1.00	0.86
	Mean Gap	3.64	0.24	0.26
	SE	1.29	0.16	0.12
	t-value	4.50	2.39	3.41
	LOS	**	*	**

Continued on the next page

industry's meager 3.31 pc, 12 times lesser in the low-technology induction period having numerous variations. In the High-technology induction period also, bank groups have gained this ratio to a great extent, and Group III banks have the highest 74.68 pc average, whereas industry records just 14.87 pc average. Quite clearly, partially IT-oriented banks have the biggest distance from fully IT-oriented banks, nearly 6 to 7 times, which is noteworthy. The huge gap confirms an impressive growth in internet banking all through the high-technology induction period, where Group III banks tops with 38.09 pc expansion and Group IV follows. Although partially IT-oriented banks witness an 11 to 15 pc growth, this is still not enough, since fully IT-oriented banks are 6 to 7 times ahead of these banks and this gap is quite high. Overall, the high-technology induction period has lesser variations and is more stable statistically.

MOBILE BANKING BRANCHES AS A PERCENTAGE OF TOTAL BRANCHES

In India, Mobile banking – also known as SMS Banking – is used mainly for balance checking, billing and other account related information by the customers. Table 8 clearly reveals that Group III banks are far ahead of other bank groups in terms of Mobile banking branches in both the

TABLE 4 *Continued from the previous page*

Group	Average	Profitability Ratios		
		NP%TI	NP%TD	NP%AAS
Group III	X_1	10.48	1.46	0.64
	X_2	13.00	1.52	0.78
	Mean Gap	2.52	0.06	0.14
	SE	3.41	0.44	0.31
	t-value	1.18	0.22	0.71
	LOS	—	—	—
Group IV	X_1	4.60	1.00	0.62
	X_2	14.46	2.37	1.32
	Mean Gap	9.86	1.36	0.70
	SE	6.56	1.17	0.68
	t-value	2.40	1.87	1.63
	LOS	*	—	—
Banking Industry Average	X_1	6.17	0.91	0.56
	X_2	11.79	1.47	0.95
	Mean Gap	5.62	0.56	0.39
	SE	1.72	0.25	0.17
	t-value	4.31	2.84	2.79
	LOS	**	*	*

NOTES NP%TI – Net Profit as percent of Total Income, NP%TD – Net Profit as percent of Total Deposits, NP%AAS – Net Profit as percent of Average Assets, X_1 – Average in Low-technology induction period, X_2 – Average in High-technology induction period, SE – Standard Error, LOS Level of Significance; * mean is significant at the 0.05 level, ** mean is significant at the 0.01 level. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

low and the high technology induction period. The high technology induction period shows improvement in the case of all bank groups, where the winners are fully IT oriented banks (Group III and Group IV banks). The growth is also statistically consistent and steadier in the case of fully IT oriented banks.

TELE-BANKING BRANCHES AS A PERCENTAGE OF TOTAL BRANCHES

Tele-banking provides the access to limited banking operations through telephone. Table 9 reveals that the average share of tele-banking branches

TABLE 5 Fully computerized branches as a percentage of total branches

Period	Year	Group I	Group II	Group III	Group IV	BI
Low-technology induction period						
	1996–1997	5.50	18.90	100.00	100.00	56.10
	1997–1998	9.91	36.12	100.00	100.00	61.50
	1998–1999	13.12	87.91	100.00	100.00	75.25
	1999–2000	16.82	90.67	100.00	100.00	76.87
	2000–2001	32.82	92.30	100.00	100.00	81.28
	Average	18.16	76.75	100.00	100.00	73.72
	SD	10.16	27.14	0.00	0.00	8.53
	CV	55.94	35.36	0.00	0.00	11.57
High-technology induction period						
	2001–2002	63.23	93.25	100.00	100.00	89.12
	2002–2003	74.72	94.27	100.00	100.00	92.24
	2003–2004	88.13	96.92	100.00	100.00	96.26
	2004–2005	92.24	98.11	100.00	100.00	97.58
	2005–2006	92.12	100.00	100.00	100.00	98.03
	2006–2007	97.74	100.00	100.00	100.00	99.43
	2007–2008	81.42	97.43	100.00	100.00	94.71
	Average	84.22	97.14	100.00	100.00	95.34
	SD	11.99	2.60	0.00	0.00	3.61
	CV	14.23	2.67	0.00	0.00	3.78

NOTES BI – Banking Industry, SD – Standard Deviation, CV – Coefficient of Variations. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

as a percentage of total branches is more than that of fully IT-oriented banks in both the low and high technology induction periods. The coefficient of variations (CV) is also less in the case of fully IT-oriented banks in both the low and high technology induction periods, which denotes steadier growth.

TECHNOLOGY INDEX

The values as given in table 10 represent in percentage the extent of technology induction for each bank group. The IT index provides in terms of a score or a number the usage of technological channels such as ATMs, Mobile banking, Tele banking and Internet banking by various

TABLE 6 ATMs as a percentage of total branches

Period	Year	Group I	Group II	Group III	Group IV	BI
Low-technology induction period						
	1996–1997	2.20	2.80	25.00	41.74	17.93
	1997–1998	4.65	4.98	40.33	79.12	32.27
	1998–1999	14.19	6.91	84.29	83.52	47.22
	1999–2000	21.22	9.15	64.13	99.41	48.47
	2000–2001	22.90	10.75	42.35	129.49	51.37
	Average	15.74	7.94	57.75	97.88	44.82
	SD	8.30	2.52	20.70	22.80	8.55
	CV	52.73	31.73	35.84	23.29	19.07
High-technology induction period						
	2001–2002	35.11	12.41	52.19	117.24	54.23
	2002–2003	36.52	14.28	51.65	175.64	69.52
	2003–2004	37.45	15.25	82.15	274.13	102.24
	2004–2005	40.01	20.45	88.35	170.31	79.78
	2005–2006	46.88	26.65	85.66	199.10	89.57
	2006–2007	47.21	28.90	80.33	231.27	96.92
	2007–2008	40.92	20.77	72.65	210.21	86.13
	Average	40.58	19.81	73.28	196.84	82.63
	SD	4.83	6.28	15.39	49.72	16.51
	CV	11.90	31.70	21.00	25.25	19.98

NOTES BI – Banking Industry, SD – Standard Deviation, CV – Coefficient of Variations. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

bank groups. In the Technology index the maximum score is obtained by Group III (Fully IT oriented banks) banks in the Low-technology induction period, and in the High-technology induction period the highest Technology Index goes to foreign banks. The lowest technology index, in both the periods, is of partially IT oriented banks (Group I and Group II banks).

Impact of Technology Index on Banks' Productivity

Productivity is a ratio of input and output. A bank's productivity is based on employees', branch and financial productivity. Employee productivity is an important part of total productivity, which comprises per employee

TABLE 7 Internet banking branches as percentage of total branches

Period	Year	Group I	Group II	Group III	Group IV	BI
Low-technology induction period						
	2001–2002	7.90	8.14	72.98	45.58	7.58
	2002–2003	15.09	15.62	80.81	47.22	8.59
	2003–2004	16.11	16.47	77.90	51.94	9.82
	2004–2005	17.38	17.99	62.88	70.01	12.37
	2005–2006	20.74	18.39	74.23	77.37	14.81
	2006–2007	23.70	25.27	79.25	80.54	36.07
	2007–2008	25.07	39.40	82.45	84.10	57.75
	Average	17.99	20.18	75.78	62.25	44.05
	SD	5.75	6.15	6.50	13.27	10.71
	CV (%)	33.82	45.66	8.70	25.14	72.02
High-technology induction period						
	2001–2002	35.11	12.41	52.19	117.24	54.23
	2002–2003	36.52	14.28	51.65	175.64	69.52
	2003–2004	37.45	15.25	82.15	274.13	102.24
	2004–2005	40.01	20.45	88.35	170.31	79.78
	2005–2006	46.88	26.65	85.66	199.10	89.57
	2006–2007	47.21	28.90	80.33	231.27	96.92
	2007–2008	40.92	20.77	72.65	210.21	86.13
	Average	40.58	19.81	73.28	196.84	82.63
	SD	4.83	6.28	15.39	49.72	16.51
	CV	11.90	31.70	21.00	25.25	19.98

NOTES BI – Banking Industry, SD – Standard Deviation, CV – Coefficient of Variations. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

productivity means units of production by an individual in terms of deposits and credits. A Bank Employee's productivity will be judged from Business per Employee. [Business per Employee = (Deposits per Employee + Credit per Employee)] and a bank branch's productivity can be calculated through Business per Branch. [Business per Branch = (Deposits per Branch + Credit per Branch)]. Branch productivity, a crucial factor of total productivity, evaluates branch level productivity means proportionate production of the bank's per branch deposits and credits. Financial Productivity is depicted by the Spread (Interest earned less

TABLE 8 Mobile banking branches as percentage of total branches

Period	Year	Group I	Group II	Group III	Group IV	BI
Low-technology induction period						
	1996–1997	0.00	0.21	4.99	9.81	3.75
	1997–1998	0.00	0.64	8.20	13.89	5.68
	1998–1999	0.00	1.37	34.78	20.45	14.15
	1999–2000	2.28	2.31	46.71	22.65	18.48
	2000–2001	6.92	3.49	64.59	40.71	28.92
	Average	1.84	1.60	31.85	21.50	14.19
	SD	3.01	1.32	25.41	11.90	14.93
	CV (%)	163.59	82.50	79.78	55.35	49.50
High-technology induction period						
	2001–2002	7.17	4.14	69.64	40.14	30.27
	2002–2003	12.56	5.48	72.73	45.00	33.94
	2003–2004	13.57	7.68	71.21	64.24	39.17
	2004–2005	13.45	11.52	56.60	75.89	39.36
	2005–2006	17.80	15.84	69.26	66.96	42.46
	2006–2007	24.94	24.91	82.32	77.31	52.37
	2007–2008	26.20	34.70	85.20	79.10	56.30
	Average	16.52	14.89	72.42	64.09	41.98
	SD	5.97	7.79	8.25	13.22	7.84
	CV (%)	40.01	67.16	11.74	25.63	76.19

NOTES BI – Banking Industry, SD – Standard Deviation, CV – Coefficient of Variations. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

Interest paid). Table 11 highlights the Employee, Branch and Financial Productivity ratios of Indian commercial banks.

Here, an attempt has been made to judge the impact of the Technology Index on the Employee productivity, Branch productivity and Financial productivity of various bank groups.

IMPACT ON EMPLOYEE PRODUCTIVITY

As shown in table 12, in the case of Group I there is a positive but moderate (0.54) correlation between employee productivity and the Technology index, but, it is significant at 5 pc LOS. At the same time R^2 shows 29 pc variations in the employee productivity by the Technology index.

TABLE 9 Tele banking branches as percentage of total branches

Period	Year	Group I	Group II	Group III	Group IV	BI
Low-technology induction period						
	1996–1997	0.00	0.01	5.77	10.71	0.97
	1997–1998	0.00	0.33	9.18	16.67	1.62
	1998–1999	0.00	0.63	23.19	27.27	1.77
	1999–2000	2.78	1.26	42.89	28.18	1.85
	2000–2001	5.74	1.75	38.28	42.14	2.14
	Average	1.70	0.80	23.86	24.99	1.67
	SD	2.56	0.70	16.68	12.07	0.43
	CV (%)	150.59	87.50	69.91	48.30	25.75
High-technology induction period						
	2001–2002	8.84	2.27	46.26	45.58	3.29
	2002–2003	10.91	4.05	65.86	43.89	3.63
	2003–2004	11.44	5.28	57.58	40.09	5.48
	2004–2005	13.32	6.29	49.75	63.83	7.41
	2005–2006	18.48	8.24	41.92	44.53	10.31
	2006–2007	22.84	16.50	47.93	58.46	22.93
	2007–2008	23.30	20.80	50.20	61.70	31.34
	Average	15.59	9.06	51.35	51.15	18.84
	SD	5.31	5.03	8.70	9.44	7.38
	CV (%)	37.11	70.75	16.88	19.11	83.48

NOTES BI – Banking Industry, SD – Standard Deviation, CV – Coefficient of Variations. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

In Group II there is a high positive correlation (0.95) between employee productivity and the Technology index, and it is also significant at 1 pc LOS. R^2 shows 90 pc variations in the dependent variable due to the Technology index. In Group III banks there is a moderate correlation of 0.59 between the independent variable and dependent variable. But it is significant at 1 pc LOS. R^2 (0.34) shows that others factor have more impact on Group III productivity than that of the Technology index. In the modern era, Group IV has a high correlation between employee productivity and the Technology index. Coefficient of determination shows 57 pc variations in employee productivity index. Overall, the Technology index of the Indian banking industry has a positive correlation of 0.97

TABLE 10 IT Index

Period	Year	Group I	Group II	Group III	Group IV	BI
Low-technology induction period						
	1996–1997	22.00	30.29	40.45	48.41	38.29
	1997–1998	38.73	38.94	46.79	49.40	41.51
	1998–1999	39.05	40.80	53.48	51.62	41.65
	1999–2000	39.98	41.25	55.52	52.83	42.14
	2000–2001	41.34	42.03	57.58	57.29	43.20
	Average	36.22	38.66	50.83	51.91	41.36
	SD	8.01	4.82	7.08	3.48	1.84
	CV (%)	22.11	12.47	13.93	6.70	4.45
High-technology induction period						
	2001–2002	42.01	43.89	58.61	57.69	43.97
	2002–2003	44.31	44.88	61.51	60.76	44.39
	2003–2004	44.60	45.75	60.29	59.10	44.72
	2004–2005	45.86	46.66	58.44	69.60	45.40
	2005–2006	48.08	47.70	59.73	59.52	45.96
	2006–2007	49.11	48.80	62.72	65.55	46.98
	2007–2008	50.22	49.10	64.40	66.23	48.30
	Average	46.31	46.68	60.81	62.63	45.24
	SD	2.61	2.10	1.73	4.58	1.11
	CV (%)	5.72	4.62	2.87	7.38	2.45

NOTES BI – Banking Industry, SD – Standard Deviation, CV – Coefficient of Variations. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

with employee productivity and it is significant at 1 pc LOS. R^2 indicates 0.94 pc impact of IT on employee productivity. If we compare the impact of IT with all the groups we conclude that Group II banks (Fully IT oriented banks) are more influenced by technology induction.

IMPACT ON BRANCH PRODUCTIVITY

In the case of Group I banks, there is a positive and very high correlation (0.99) between branch productivity and the Technology index (table 12). The coefficient of determination also shows 98 pc variations in the dependent variable due to the Technology index and it is significant at 1 pc LOS.

Similarly, in Group II banks the correlation between the dependent variable and independent variable is also very high (0.98) and is also significant at 1 pc LOS. R^2 shows 96 pc variations in the dependent variable due to the independent variable. The correlation between employee productivity and the Technology index in Group III banks is positive but moderate (0.56). The effect of other factors is 69 pc. The correlation is significant at 5 pc LOS. In Group IV banks there is high correlation (0.91) and it is also significant at 1 pc LOS. The coefficient of determination indicates that 82 pc variations have been caused by the Technology index. Overall, the Indian banking industry also has a very high coefficient of correlation and determination i. e. 0.98 and 0.96. In conclusion, we can see that the effect of IT on branch productivity is highest on Group I and Group II banks (Partially IT oriented banks) and lowest on Group III banks (Fully IT oriented banks).

IMPACT ON FINANCIAL PRODUCTIVITY

Group I has a positive but very low correlation (0.11) between the dependent variable and independent variable. The coefficient of correlation is also statistically not significant (table 12). R^2 shows positive but negligible variations in the financial productivity. In Group II banks there is a negative but low correlation (–0.05) between financial productivity and the Technology index. The coefficient of determination is also negligible (0.02) in this group and R is insignificant. In the same manner, in Group III banks the coefficient of correlation between two variables is also negative but low (–0.24). The coefficient of determination shows only 5 pc variations in the financial productivity of banks due to technology. Foreign banks like private sector banks have almost the same coefficient of correlation – negative but low (–0.27). The coefficient of determination shows only 7 pc variations in the financial productivity of banks due to technology.

Overall, for the banking industry, the correlation between financial productivity and Technology index is low and negative (–0.45) and it is insignificant. The coefficient of determination indicates that the effect of other factors is more than the effect of Technology in financial productivity. These factors may be liberalization of interest rates, managerial effectiveness, internal and external policies of the banks, and so on. Finally, we can conclude that the effect of IT on financial productivity of banks is negative, though not much. Only in the case of Group I banks is it positive, but that too is very low.

TABLE 11 Productivity ratios of Indian commercial banks

Group	Variable	Employee Productivity			Branch Productivity			Financial Productivity		
	Average	D/E	C/E	BUS/E	D/B	C/B	BUS/B	IE%AAS	IP%AAS	S%AAS
Group I	X_1	0.83	0.39	1.22	13.88	6.48	20.36	9.24	6.36	2.87
	X_2	2.60	1.55	4.15	27.80	17.06	44.86	7.30	4.44	2.85
	Mean Gap	1.77	1.16	2.93	13.91	10.58	24.50	1.94	1.92	0.02
	SE	1.19	0.65	1.82	6.25	5.63	11.85	0.80	0.75	0.19
	t-value	2.37	2.83	2.56	3.55	2.99	3.30	3.89	4.09	0.13
	LOS	*	*	*	**	*	**	**	**	—
Group II	X_1	0.79	0.39	1.18	18.16	8.86	27.02	8.90	6.01	2.91
	X_2	1.91	1.18	3.09	38.13	23.36	61.50	7.62	4.59	3.04
	Mean Gap	1.12	0.79	1.91	19.98	14.50	34.48	1.28	1.41	0.13
	SE	0.41	0.47	0.76	7.02	8.79	13.03	0.58	0.68	0.28
	t-value	4.37	2.68	4.02	4.07	2.63	3.98	3.50	3.30	0.72
	LOS	**	*	**	**	*	**	**	**	—
Group III	X_1	5.22	2.69	7.92	76.03	38.82	144.85	8.69	6.59	2.08
	X_2	5.31	4.17	9.48	141.15	111.14	252.29	6.25	4.12	2.11
	Mean Gap	0.09	1.48	1.57	65.12	72.32	137.44	2.44	2.47	0.03
	SE	0.75	0.38	1.05	35.50	27.01	62.08	1.09	1.04	0.49
	t-value	0.18	6.32	2.38	2.93	4.14	3.49	3.58	3.77	0.09
	LOS	—	**	*	*	**	**	**	**	—
Group IV	X_1	3.78	2.44	6.23	299.49	193.66	493.15	9.74	6.31	3.43
	X_2	5.62	4.44	10.06	493.99	394.25	888.24	6.69	3.34	3.34

	Mean Gap	1.84	2.00	3.83	194.50	200.63	395.09	3.05	2.97	0.09
	SE	0.73	0.53	1.22	101.69	91.98	191.67	1.00	1.11	0.54
	t-value	4.04	6.02	5.02	3.05	3.49	3.29	4.88	4.27	0.27
	LOS	**	**	**	*	**	**	**	**	—
Banking Industry Average	X_1	2.65	1.47	4.13	101.84	61.95	171.34	9.14	6.31	2.83
	X_2	3.86	2.83	6.69	143.51	136.45	311.72	6.96	4.12	2.81
	Mean Gap	1.21	1.36	2.56	41.67	74.50	140.38	2.17	2.19	0.02
	SE	0.62	0.55	1.17	9.90	8.79	18.67	0.71	0.75	0.11
	t-value	3.52	3.05	3.31	3.22	2.87	3.06	4.40	4.03	0.77
	LOS	**	*	**	*	*	*	**	**	—

NOTES X_1 – average in low-technology induction period, X_2 – average in high-technology induction period, D/E – Deposit per Employee, C/E – Credit per Employee, BUS/E – Business per Employee, D/B – Deposit per Branch, C/B – Credit per Branch, BUS/B – Business per Branch, IE%AAS – Interest Earned as percent of Average Assets, IP%AAS – Interest Paid as percent of Average Assets, S%AAS – Spread as percent of Average Assets, * Mean is significant at the 0.05 level, ** Mean is significant at the 0.01 level. Computed from the data published by Performance Highlights of Indian Banks, Indian Bank Association, 1996–2008.

TABLE 12 Impact of Technology Index on productivity of bank groups

Group	Employee Productivity		Branch Productivity		Financial Productivity		Total Productivity	
	R	R^2	*R*	R^2	*R*	R^2	*R*	R^2
Group I	0.54*	0.29	0.99**	0.98	0.11	0.01	0.68*	0.46
Group II	0.95**	0.90	0.98**	0.96	–0.05	0.02	0.80**	0.64
Group III	0.59*	0.34	0.56*	0.31	–0.24	0.05	0.58*	0.33
Group IV	0.76**	0.57	0.91**	0.82	–0.27	0.07	0.90**	0.81
Indian Banking Industry	0.97**	0.94	0.98**	0.96	–0.45	0.20	0.95**	0.90

NOTES * Mean is significant at the 0.05 level (1-tailed), **Mean is signif. at the 0.01 level (1-tailed). *R* – coefficient of correlation, R^2 coefficient of determination.

IMPACT ON TOTAL PRODUCTIVITY

In the case of Group I banks, the coefficient of correlation between the Technology index and total productivity of banks is positive though not very high, but significant at 5 pc LOS (table 12). The coefficient of determination shows 46 pc variations in the total productivity due to technology. In Group II, the correlation between the total productivity and the Technology index is high (0.80), but the variations in the total productivity are 64 pc, which are moderate. The coefficient of correlation is significant at 1 pc LOS. In the case of Group III banks, the correlation between total productivity and the Technology index is moderate, and the impact of other factors on total productivity is more than the IT. The correlation is significant at 5 pc LOS. There is a high correlation between total productivity and the Technology index in the case of Group IV. The coefficient of determination indicates that there are 81 pc variations in total productivity due to Technology. The coefficient of correlation is significant at 5 pc LOS. Overall, the Indian banking industry is highly affected by the Technology index. The correlation between the dependent variable and IT is high. The Indian banking industry is only 10 pc affected by the other factors, which indicates that it is 90 pc affected by IT. The *R* is significant at 1 pc LOS. Finally, we can conclude that among all the bank groups the highest effect of IT is on Group II and Group IV banks, and the lowest effect of IT is on Group III banks.

Concluding Remarks

In the present study, it is found that the partially IT oriented banks are less profitable than the fully IT oriented banks. However, in terms of overall productivity and profitability their performance is gradually improving over the recent years. Foreign banks are on the top in terms of the overall productivity and profitability parameters (which supports the findings of Sarkar et al, 1998). Analyzing further, it is found that SBI and associate banks (Partially IT oriented banks) are ranked second after the foreign Banks (Fully IT oriented banks) in terms of the spread ratios, but they have higher Burden ratios, which makes them less profitable as compared to the Private Banks. The Private Banks (Fully IT oriented banks) are more profitable as they have the lowest financial burden in the two periods. Moreover, they have a high proportion of non-interest income and a comparatively low level of non-interest expenditure ratios as compared to the SBI group of banks. The Interest earned ratios are declining over the years for all groups of banks because over the last few years RBI

(Central bank) has pursued the policy of lowering the interest rates. Still, foreign Banks were able to have highest Interest earned ratios in the low technology era as compared to the Indian Banks. In the high technology period, the SBI group has the highest Interest earned ratio. The Interest earned ratio for the Indian Banks has almost been the same across all the categories. The Interest paid ratio is the lowest for the foreign Banks (followed by private sector banks) in the high technology era. This can be attributed to the effective and efficient fund management by these banks through which they were able to raise funds at lower costs and use them for profitable avenues. In terms of the financial performance analysis, the findings of the present study support, to a large extent, the findings of the studies by Sarkar, Sarkar and Bhaumik 1998; Shanmugam and Das 2004; Uppal and Kaur 2007; and Kumar and Sreeramulu 2008.

Overall, for the banking industry, the correlation between financial productivity and the Technology index is low and negative and statistically insignificant. The co-efficient of determination indicates that the effect of other factors is more than the effect of Technology on financial productivity. These factors may be liberalization of interest rates, managerial effectiveness, risk management, internal and external policies of the banks and so on. Finally, we can conclude that the effect of IT on financial productivity of banks is negative, though not much. Only in the case of Group I banks is it positive, but that too is very low. Therefore, there is no conclusive and coherent evidence that technology leads to better financial performance. However, it is safe to say that the various banking parameters of productivity and profitability have significantly improved in the high technology induction era. From the analysis, the winners emerging are Fully IT oriented banks. Foreign banks are at the top, followed by Private Banks. From the Partially IT oriented banks, SBI and its associates are performing better than other public sector banks. Overall, the Indian banking sector has performed well on various fronts in the recent years.

References

Aggarwal, S. 2007. 'Indian Banking: Achieving Excellence via Good Governance.' *Bankers Conference Proceedings,* November: 66–71.

Arora, U., and R. Verma. 2005. 'Banking Sector Reforms and Performance Evaluation of Public Sector Banks in India.' *Punjab Journal of Business Studies* 1 (1): 11–25.

Aggarwal, M. 2005. 'Liberalization's Effect on Operational Productivity of Commercial Banks in India.' IBA *Bulletin* 27 (6): 33–40.

Barua, A., C. Baily, T. Kriebel, and T. Mukhopadhyay. 1991. 'Information Technology and Business Value: An Analytical and Empirical Investigation.' Working Paper, University of Texas, Austin, TX.

Bhaskar, P. V. A. 2005. 'Trends towards Universal Banking with Strategic Alliances.' IBA *Bulletin* 27 (3): 8–11.

Brynjolfsson, E. 1993. 'The Productivity Paradox of Information Technology.' *Communications of the* ACM 35 (7): 66–7.

Brynjolfsson, E., and L. Hitt. 1996. 'Paradox Lost? Firm-Level Evidence on the Returns to Information Systems Spending.' *Management Science* 42 (4): 541–58.

Dos Santos, B. L., K. G. Peffers, and D. C. Mauer. 1993. 'The Impact of Information Technology Investment Announcements on the Market Value of the Firm.' *Information Systems Research* 4 (1): 1–23.

Habbar, R. 2004. 'Building Trust in E-Banking.' *Vinimaya* 24 (3): 14–23.

Jordan, J., and J. Katz. 1999. 'Banking in the Age of Information Technology.' *Regional Review* 9 (2): 39–50.

Kamakodi, N. 2007. 'Customer Preferences on E-Banking Services: Understanding through a Sample Survey of Customers of Present Day Banks in India.' *Banknet Publications* 4:30–43.

Krishnaveni, R., and D. D. Prabha. 2006. 'Insight into the Internal Service Quality Perceptions of Bank Employees.' *Prajnan* 34 (2): 165–72.

Kumar, S., and M. Sreeramulu. 2008. 'Employees' Productivity and Cost: A Comparative Study of Banks in India During 1997 to 2008.' *Reserve Bank of India Occasional Papers* 28 (3): 35–50.

Lakhsmi Naraynan, P. 2004. 'Corporate Governance of Banks.' IBA *Bulletin* 26 (7): 14–7.

Lal, R. C. 2007. 'Banking Transformation through IT in India.' *Journal of Commerce and Trade* 2 (2): 46–8.

Loveman, G. W. 1994. 'An Assessment of the Productivity Impact of Information Technologies.' In *Information Technology and the Corporation of the 1990s: Research Studies,* edited by T. J. Allen, and M. S. Scott Morton: 84–110. Cambridge, MA: MIT Press.

Lichtenberg, F. 1995. 'The Output Contributions of Computer Equipment and Personnel: A Firm Level Analysis.' *Economics of Innovation and New Technology* 3 (4): 201–17.

Madhavankutty, G. 2007. 'Indian Banking: Towards Global Best Practices".' *Bankers Conference Proceedings,* November: 84–6.

Malhotra, P., and M. Singh. 2005. 'New Revaluation in the Indian Banking Industry: Internet Banking.' *Punjab Journal of Business Studies* 1 (1): 75–86.

Mariappan, V. 2006. 'Changing the Way of Banking in India.' *Vinimaya* 26 (2): 26–34.

Mishra, J. K., and M. Jain. 2007. 'Constituent Dimensions of Customer Satisfaction: A Study of Nationalized and Private Banks.' *Prajnan* 35 (4): 390–8.

Mohan, R. K. 2003. 'Transformation in Indian Banks.' IBA *Bulletin* 25 (3): 1–14.

Morrison, C. J., and E. R. Berndt. 1990. 'Assessing the Productivity of Information Technology Equipment in the US Manufacturing Industries.' National Bureau of Economic Research Working Paper 3582, National Bureau of Economic Research, Cambridge, MA.

Muniappan, G. P. 2002. 'Indian Banking: Paradigm Shift – A Regular Point of View.' IBA *Bulletin* 24 (3): 151–5.

Narayanasami, T. S. 2005. 'Rural Lending: A Commercial Venture for All Classes of Banks.' IBA *Bulletin* 27 (6): 5–8.

Paul, J., and A. Mukherjee. 2007. 'Retail Banking, ATMs and Supply Chain Management in Banking: A Study of Two Banks'." *Prajnan* 35 (1): 47–60.

Padwal, S. M. 2004. 'Data Warehousing and CRM in Banking.' *Vinimaya* 25 (1): 19–30.

Patnaik, S. 2004. 'Shared ATMs – The Way Forward.' IBA *Bulletin* 26 (12): 24–7.

Raveendra, P. V. 2007. 'Customer Relationship Management in Financial Services.' *Banknet Publications* 4:57–67.

Sarkar J, S. Sarkar, and S. K. Bhaumik. 1998. 'Does Ownership always Matter? Evidence from the Indian Banking Industry.' *Journal of Comparative Economics* 26 (2): 262–81.

Shanmugam, K. R, and A. Das. 2004. 'Efficiency of Indian commercial Banks during the reform period.' *Applied Financial Economics* 14:681–86.

Sharma, R. D., G. Kaur, and J. Sharma. 2007. 'Customer Delight: A Road to Excellence for Banks.' NICE *Journal of Business* 2 (2): 1–2.

Shanker, A. G. 2004. 'Customer Service in Banks.' IBA *Bulletin* 26 (8): 5–8.

Sharma, T., and S. Dhanda. 2007. 'Perceptions of Customer Value: An Empirical Study.' *Indian Management Studies Journal* 11 (2):15–48.

Singh, S. 2004. 'An Appraisal of Customer Service of Public Sector Banks.' IBA *Bulletin* 26 (8): 30–3.

Singh, D., and S. Kabiraj. 2007. 'IT and CRM Applications in Indian Retail Banks.' Paper presented at the Banknet's Third International Bank Tech Summit, 10 October, Mumbai, India.

Sooden, M., and M. Bali. 2004. 'Profitability in the PSBs in India in the Pre and Post Reform Period.' *Indian Management Studies Journal* 8 (2): 69–91.

Strassman, P. A. 1990. *The Business Value of Computers.* New Canaan, CT: Information Economics Press.

Subbaroo, P. S. 2007. 'Changing Paradigm in Indian Banking.' *Gyan Management* 1 (2): 151–60.

Thakur, R. K. 2007. 'Delivering Superior Customer Service.' *Bankers Conference Proceedings,* November: 44–7.

Uppal, R. K. 2008. 'Customer Perception of E-Banking Services of Indian Banks: Some Survey Evidence.' *The* ICFAI *Journal of Bank Management* 7 (1): 63–74.

Uppal, R. K., and R. Kaur. 2007. 'Indian Banking Industry: Comparative Performance Evaluation in the Liberalized and Globalized Era.' *Gyan Management* 1 (2): 3–24.

Vanniarajan, T., and S. M. Nathan. 2008. 'Performance Only Measurement of Service Quality and Customer Satisfaction in Indian Commercial Banking.' *Punjab Journal of Business Studies* 3 (2): 1–16.

Wilson, D. 1993. 'Assessing the Impact of Information Technology on Organizational Performance.' In *Strategic Information Technology Management,* edited by R. Banker, R. Kauffman, and M. A. Mahmood: 471–514. Harrisburg, PA: Idea.

Technology, Wealth and Modern Management of Technology

Slavko Dolinšek
Peter Štrukelj

In the paper, we propose somewhat different conceptualizations of technology, of a fundamental relationship between technology and wealth in a society, of technological capability, and of management of technology. We based our proposed conceptualizations on the current general and relevant technological practice. In order to infer these conceptualizations, we studied today's largest companies worldwide in different production and technology sectors as well as some general reporting on technology from technology-oriented media. These fundamental conceptualizations may be of interest to all those who are practically or theoretically concerned with technology, wealth, technological capability and management of technology, and who want to comprehend the essence of technology and its relations to phenomena, such as wealth and management ('to get the big picture'). At the end, we explain why there is a need in modern companies to manage technologies and what a new paradigm of management of technology is, i. e. what new challenges and trends a modern management of technology has to face.

Key Words: technology, wealth, technological capability, management of technology, technology trends
JEL *Classification:* I31, J30, M10, O3

Introduction

The paper is about the fundamental relationship between technology, wealth, technological capability and management.

Technology is a phenomenon that most people intuitively regard as rather important for their lives and purposes. 'Technology has a profound impact on our lives. On the one hand it is the source of many benefits and most of our wealth. On the other it is disturbingly disruptive. To harness it effectively calls for pervasive understanding, managerial skill

Dr Slavko Dolinšek is a Professor at the Faculty of Management, University of Primorska, Slovenia.

Peter Štrukelj is a Lecturer at the Faculty of Management, University of Primorska, Slovenia.

Managing Global Transitions 10 (1): 29–49

and good luck' (Van Wyk 2004, 10). Yet despite this, it seems that people generally do not have a clear idea (concept) of what technology really is and how it is connected to our lives and purposes. Van Wyk points out that there is a growing need in our society for a better understanding of technology: 'We need a simple, comprehensive grasp of technology. We need to understand at the macro level how technology is composed, how it evolves and how it interacts with other systems' (p. 6). Despite the deciding impacts of technology on our lives, 'our understanding of technology is poorly structured. Technological knowledge has not undergone that profound simplification that marks the development of most fields of knowledge as they grow to maturity' (p. 10). From a scientific point of view, it is therefore our first task, quite strangely, to convincingly determine and explain what technology is, before we can actually go any further in analyzing and understanding technology in its connection to other related phenomena, such as wealth and management. If we consider some of the most relevant and acknowledged literature on technology and management of technology, we find that relevant and acknowledged authors (e. g. Burgelman et al., 1998; Khalil, 2000; Van Wyk, 2004; Zeleny 1986) define technology somewhat differently and that there is no generally accepted definition of technology among these authors (also in general, there are numerous and quite diverse definitions and conceptions of technology). In the past few years, a few scholars have searched for a fundamental theoretical structure that underpins all technology – and there is a growing need for this structure. 'This search could possibly yield one of the most significant conceptual foundations for the 21st century. Such a fundamental structure would materially improve our understanding of technology, enhance our ability to manage it better, and increase our effectiveness in formulating public policy in this area' (Van Wyk 2004, 13).

In the practice of technology management, there is also evidence of the need for better theoretical structure. 'Most corporate managers will admit to being blindsided by new technology. Rare indeed is the chief executive officer who systematically maps the global technological landscape and who knows where to expect definitive developments [...] In the world of investments, monies flow in and out of technology-based companies more on the basis of fashion than on the basis of rational technology analysis' (Van Wyk 2004, 14).

According to the International Association for the Management of Technology (IAMOT), technology is a large and growing part of every

manager's daily experience – managers develop technology, use technology, buy technology and sell technology. Fusfeld (1978) pointed out that in general, key management decision makers have inadequate background and ability to make judgments and forecasts in the area of technology. And without that ability, their options in utilizing technology in corporate strategy are severely limited. Many executives, venture capitalists, and entrepreneurs know of corporate success in which technology had played a dominant role. Many dream of technology being turned into a profit and these dreams are motivated by real-life successes. Fusfeld stresses that, despite the obvious role of technology in very successful enterprises, technological issues are only occasionally explicitly included in typical corporate strategy reviews, and only rarely are they among the regular inputs to corporate planning and development. Technology is addressed in strategic plans only implicitly, except in the case of special endeavors which are outside the main lines of production – new and joint business ventures, licensing, and acquisitions. Tesar et al. (2003, 5–10) stress that managers have to understand the technological side of the business just as well as the marketing side and they need to properly coordinate technical and marketing competencies in firms. Burgelman et al. (1998, 1) pointed out that 'strategic management of technology and innovation is a young field and the domains of different, partly overlapping concepts are still somewhat in flux.'

The main purpose of the paper is thus to provide a general understanding of what technology is (and how it is connected to wealth in a society), what is a technological capability, what is management of technology and what are the main challenges of the modern practice of managing technologies. In each of these fundamental elements, we first present what relevant authors have said about these elements, and then we propose, based on our research and analysis of the current general and relevant technological practice, our own conceptualizations of these elements. These fundamental conceptualizations may be of interest to all those who are practically or theoretically concerned with technology, wealth, technological capability and management of technology.

How to Conceptualize Technology

Our review of literature on the theory of technology and management of technology shows (as is generally the case in modern social sciences) that there is no single definite, clear, convincing and generally accepted definition or conception of what technology actually is. Leading academic

authors in management of technology propose the following conceptualizations of technology.

Khalil (2000, 1–2), for example, says that 'technology can be defined as all the knowledge, products, processes, tools, methods, and systems employed in the creation of goods or in providing services [...] it is common to think of technology in terms of hardware, such as machines, computers, or highly advanced electronic gadgets. However, technology embraces a lot more than just machines. There are several technological entities besides hardware, including software and human skills.' Zeleny (in Khalil 2000, 2) proposed a conception that any technology consists of three interdependent, codetermining, and equally important components:

- *Hardware:* The physical structure and logical layout of the equipment or machinery that is to be used to carry out the required tasks.
- *Software:* The knowledge of how to use the hardware in order to carry out the required tasks.
- *Brainware:* The reasons for using the technology in a particular way. This may also be referred to as the know-why.

Khalil also stresses that in addition to the above three components, a fourth one must be considered independently, for it encompasses all levels of technological achievements, and that is know-how: 'The learned or acquired knowledge of or technical skill regarding how to do things well. Know how may be a result of experience, transfer of knowledge, or hands-on practice. People acquire technical know-how by education or training or by working closely with an expert in a certain field.' Khalil concludes that it is 'only when knowledge is practically implemented to create new things, operate a system, or provide a service that we enter the realm of technology.'

Van Wyk (2004, 23), for example, suggests that 'technology is competence, created by people, and expressed in devices, procedures and human skills [...] devices, procedures and human skills reflect the three constituent elements that combine to form a unit of technology – a technology entity.' Van Wyk links technology to developed capability, i. e. ways and means for taking action. However, technology is not concerned with the ultimate ends of the action. Van Wyk emphasizes the artificial nature of technology; technology is man-made, meaning that it does not occur spontaneously in nature.

Burgelman et al. (1998, 2), on the other hand, say that 'technology

refers to the theoretical and practical knowledge, skills, and artifacts that can be used to develop products and services as well as their production and delivery systems. Technology can be embodied in people, materials, cognitive and physical processes, plant, equipment, and tools.'

A Proposed New Conceptualization of Technology

If we study the above cited definitions and conceptions of technology, we can conclude that these definitions and conceptions are basically different from one another, yet they have certain similarities and common themes (knowledge, skills, artifacts, processes, methods). Since these definitions and conceptions are a result of theoretical work, the most important theoretical question in this respect is whether these conceptions adequately and correctly conceptualize current technological practice, i. e. our current practical experience with technology. In order to answer this question properly, it is necessary to study where (in which organizations/institutions) the term technology is most commonly used, where technology is regarded as very important or even decisive for achieving purposes of organizations, and how the term technology is used (what do people mean when they speak of technology) in these organizations.

Our experience with technology shows that it is in companies that produce commodities where the term technology is most commonly used, where it is regarded as very important or even decisive for achieving purposes of these companies. Our experience with technology also shows that technology is being invented, developed and used predominantly (but not exclusively) in companies that produce commodities. It is therefore necessary to be acquainted with how the term technology is being used in these companies, and what is meant by technology when this term is used by these companies.

For the purpose of becoming acquainted with how the term technology is being used in modern companies, we used companies' annual reports and technology related documents available on companies' web pages. In the first round, we studied some of the largest companies in the following technologically most advanced manufacturing sectors: energy, nanotechnology, biotechnology, information technology, electronics, robotics and aerospace. Our study shows that in these companies, technology refers to:

- methods, techniques, procedures, processes, activities of production (see for example ExxonMobil 2009, 2008; iRobot 2009; Nanophase 2010; AMGEN 2010),

- machines and devices by means of which processes of production are carried out (see for example ExxonMobil 2009, 2008; AMGEN 2010),
- devices (systems) and their processes that are included as components in final products (see for example iRobot 2009; Boeing 2009; Microsoft 2009; Sony 2010).

Examples of methods of production are cogeneration, directional drilling (ExxonMobil 2009), molecular fingerprinting (ExxonMobil 2008), surface treatment and coating processes, physical vapor synthesis, nanoarc synthesis (Nanophase 2010), genetic engineering utilizing restriction enzymes, polymerase chain reaction, cell culture, gel electrophoresis, protein electrophoresis, mass spectrometry, DNA sequencing and computerized imaging, X-ray crystallography (AMGEN 2010).

Examples of machines and devices by means of which processes of production are carried out are: land-based drilling rig, microscope (ExxonMobil 2009), thermocycler, DNA microarrays (AMGEN 2010), middleware platforms (Microsoft 2009).

Examples of devices (systems) and their processes that are included as components in final products are: lithium-ion battery separator film (ExxonMobil 2008), code bases, modules, signal processing, laser scanners, cameras, optical sensors, payloads, interfaces, controllers, platforms, manipulators, algorithms (iRobot 2009), remote vision systems, refueling pods, hose drum units, digital cockpits (Boeing 2009), cloud computing ecosystems, natural user interfaces, file formats, programming interfaces, protocols, automated reasoning, adaptation, human-computer interaction (Microsoft 2009), lenses, close-proximity wireless transfer, image processing engine (Sony 2010).

In the second round, we then studied:

- world largest companies in 2010 (Fortune 2010b),
- world largest financial companies in 2010 (Fortune 2010b), and
- US largest service companies in 2010 (Fortune 2010a),
- general public reporting on technology and its development (Technology Review (2011) and New Scientist – Technology).

Our study shows that in these companies and in this general public reporting, technology refers to:

- machines and devices that are used in manufacturing (processing), storing and delivering of material products, energy and information,

- processes (with the use of machinery and devices) of manufacturing (processing), storing and delivering material products, energy and information,
- devices and their processes that are included as components in final products,
- advanced functional materials,
- most generally, devices that people and organizations use in their activities.

This is our proposed conceptualization of technology that is derived from our study of current general and relevant technological practice, and not from past uses of the term 'technology' (etymological conceptualization) or from a recombination of numerous diverse definitions and conceptualizations of technology at present.

Our conceptualization of technology is similar to the above cited definitions and conceptualizations of technology by different academic authors. What is most specific in our conceptualization is the third element of technology: devices (systems) and their processes that are included as components in final products. This element is not explicitly present in the above cited conceptualizations; however, it might be implicitly included.

All the above cited conceptualizations by different academic authors stress knowledge and skills as necessary elements of technology. Our study of both the world's largest as well as the technologically most advanced companies shows that these companies do not immediately refer to technology as knowledge or skills, but they rather speak of technological or technical expertise, technical knowledge, technical skills when they refer to knowledge and skills. Also, when companies explain how their technologies work, they provide knowledge on these technologies. However, machines, devices and processes of production (manufacturing, storage and delivery) would not function as such if the knowledge and skills to use them rationally, purposefully, effectively, productively were lacking. Knowledge and skills are fundamental to consistently use machines, devices and processes of production rationally and effectively. Knowledge and skills to rationally and effectively use technology are a necessary presupposition of technology. Without knowledge and skills, machines, devices and processes of production would be just some unknown, unuseful, arbitrary and coincidental processes and pieces of material.

According to our conceptualization, technology does not refer to tools or accessories as such, but only to one part of tools or accessories – i. e. machines and devices. Machines and devices not only enable and make our work easier (like tools in general), but they perform some work (execute functions) themselves (thus replacing or complementing human labor), and this distinguishes them from tools or accessories that do not perform any work by themselves (e. g. a simple knife, a pencil, a hammer). Technology also does not equal equipment for production as such, because technology is only one part of this equipment – again machines, devices and their processes, and not buildings or furniture.

According to our conceptualization, technology also does not refer to processes or procedures of activity or work as such, but only to processes of one part of our activity or work – i. e. manufacturing (processing), storing and delivering material products, energy and information, whereby machines and devices are being used.

Technology and Wealth in a Society

Khalil (2000, xix) states that technology has always been intertwined with society's progress and it has been linked to improvements in standards of living: 'The human aspiration for a better life increasingly depends upon technology and its effects on all aspects of life' (Khalil 2000, xix). Today's pace and scope of technological change are having profound effects on every human institution. Technology has enabled humans to achieve unprecedented change in their way of life.

We propose to say that a *principal* relationship between technology and wealth is that by inventing, developing technologies, by using them and by advancing, improving them, we can:

- produce existing goods more efficiently,
- produce more goods,
- produce better goods,
- produce new goods,
- save labor (though development, maintenance and advancement of technology requires labor) and increase leisure/spare time,
- make labor easier,
- improve goods,
- make activities easier,
- enable new activities.

This is the *essential possibility* of technology in relation to wealth. We *can* do all of the above with technology. Development, use and advancement of technology/-ies *can* mean our greater dominance and power over nature; it *can* mean our greater dominance and control of our material life conditions. Technological advancement *can* be decisive for the better quality of our lives. Technology *can* empower people.

However, whether this *essential possibility* of technology is realized and to what extent it is realized, depends on the availability of material resources, people's will and their ingenuity, skills and capabilities to develop, use and advance technology. Also, if technology is developed, used and advanced in a particular society, then whether this *essential possibility* of technology is realized and to what extent it is realized depends on the principles of the socio-economic order in that society in which technology is developed, used and advanced.

For example, in capitalism (the present predominating global socio-economic order), technology is being constantly invented and existing technology constantly advanced.[1] In capitalism, by inventing, developing, designing technologies, by using them and by advancing, improving them, existing commodities are produced more efficiently, more commodities are produced, better commodities are produced (though not all commodities tend to be better, because there are necessarily different levels of purchasing power – those with the highest purchasing power tend to get the best quality commodities), new commodities are produced, commodities are improved (by including technology as a component in final products), activities are made easier and new activities are enabled.

However, in capitalism, the essential possibility of technology in saving labor and increasing leisure/spare time or in making labor easier is not realized. In capitalism, technology is not invented, used and advanced in order to save labor as such and to increase leisure/spare time as such, but to save paid labor and thereby to decrease labor costs. A necessary consequence of constant technological invention and advancement in capitalism is increasing unemployment (saving paid labor in producing commodities, less and less workers are needed to produce the same amount of commodities) and employing new workers at the same time, because new technologies create new production processes (and new markets) where new workers are needed (technological change is the chief source of new profitable areas). In capitalism, these two opposite tendencies in the technology-labor relation are in force all the time, not just in times of (increasing) profits, but also in times of crises.

Also, in capitalism, essential possibilities of technology and therefore its contribution to wealth are only in part realized. Rubinstein (1931) explained this in the following manner:

> Capitalism, in developing machine production, pursues the purpose not of developing the means of production, but of increasing the profits. Therefore, capitalism introduces a new machine only when the difference between the price of this machine and the cost of labor that it replaces is sufficiently large to secure an average profit and successful competition in the market. Already at the commencement of capitalist development we find a number of cases when inventions or improvements in machinery were either entirely held in abeyance or they were utilized not in the country where they were originated, because labor in that country happened to be so cheap that the adoption of the machine was unprofitable and undesirable to the capitalists [...] Unemployment, under capitalism, is the inevitable consequence of technical progress, and in its turn, it checks the further development of technical progress, the introduction of new machines, and the application of new scientific methods in industrial practice [...] These tendencies to check and obstruct technical, and consequently also scientific development, become particularly pronounced in the final monopoly stage of capitalism [...] Under capitalism, the adoption of technical achievements is always considerably below the extent possible under a given level of scientific and technical development [...] real application of technical discoveries lags far behind the already possible development of the forces of production [...] To begin with, these tendencies of monopoly capitalism, by hindering the growth of the forces of production, clip the wings of scientific creative activity, technical initiative, and inventiveness. A huge portion of scientific work, the labour of many years, is practically wasted finding no application in industry, in life, in reality. [...] Already the present state of science and technique secures such a gigantic growth of the forces of production as modern capitalism is unable to realize.

The German scientific group GegenStandpunkt (1983) also explained that technology in capitalism is not developed and used in production of commodities in order to make labor easier, but in order to make production more cost-effective for entrepreneurs. By using new technologies (machines and devices) and thus by new divisions of labor, the same

commodities can be produced cheaper, as long as additional expenditures for 'technical progress' are compensated by saved wages. By means of rationalization of his company, a capitalist increases the productivity of labor and at the same time takes care for dismissing or not employing a part of the workers.

In capitalism, substitution of labor through technology thus has the advantage of increasing productivity of labor. But this substitution also has disadvantages. By means of introducing machines and automatization into the labor process, a man becomes more and more dependent on technical apparatus. This dependence then manifests itself in substantial shifts in the cost-structure of a company; by means of substituting labor through technology, a share of proportional costs (wages) inside the company's total costs decreases, while fixed costs of growing installations substantially increase. Thereby, a company becomes more inflexible – the lower price-limit is very high due to increased and high fixed costs. A company can therefore get into troubles if its sales decrease (even in a slight manner) for a longer period of time – in that case, a company cannot cover its fixed costs any more.

To sum up, how and to what extent a technology contributes to wealth in a society depends on the principles of the socio-economic order in that society, in which technology is developed, used and advanced. These socio-economic principles determine the contribution of technology to wealth in each particular society. And since each socio-economic order is governed by different socio-economic laws, technology then differently and to a different extent contributes to wealth in each particular (past, present, or any possible future) socio-economic order.

Technological Capability

In 1987, the National Research council stated the following: 'Management of technology links engineering, science and management disciplines to plan, develop, and implement *technological capabilities* to shape and accomplish the strategic and operational objectives of an organization' (National Research Council 1987, 9). Technological capability is one of the central elements in the practice of technology management. Theory in management of technology should therefore pay sufficient attention to this phenomenon and provide some satisfying results. Based upon convincing conceptualization of technology, the most important concept in management of technology has to be developed, i. e. technological capability.

In the literature on management of technology, the concept of technological capability is often used in different contexts. However, as with the case of general conceptualization of technology, the concept of technological capability also lacks one definite, clear, convincing and generally accepted conceptualization. Zedtwitz and Jin (2004) point out that the definition of technological capability is varied in perspective, depending on the aims of the researchers. Lall, for example, defined technological capability broadly as 'the entire complex of human skills (entrepreneurial, managerial and technical) needed to set up and operate industries efficiently over time' (Lall in Zedtwitz and Jin 2004, 2). He defined technological capability in the narrow sense as the capability to execute all the technical functions entailed in operating, improving and modernizing the firm's productive facilities. It is categorized to the investment TC, the production TC, and linkages TC according to the functions (Lall in Zedtwitz and Jin 2004, 2). Kim pointed out that in the developing countries 'technological capability' could be used interchangeably with 'absorptive capacity' (Kim in Zedtwitz and Jin 2004, 2): absorbing existing knowledge, assimilating it, and in turn generating new knowledge. Zedtwitz and Jin (2004, 2–3) themselves define technological capability as the capability to make effective use of the technical knowledge and skills, not only in the effort to improve and develop the products and processes, but also to improve the existing technology and to generate new knowledge and skills, in response to the competitive business environment.

Our Proposed Conceptualization of Technological Capability

Based upon our conceptualization of technology (see above), we propose the following conceptualization of technological capability: technological capability refers to our capability (capacity) to use technologies (as well as knowledge and skills necessary for their proper use) in a way that contributes to effective and successful achievement of our purposes.

Technology can be either a purpose itself or some of our means by which we achieve some other purposes, or both. Our experience with technological practice shows that usually, technology is not a purpose by itself, but is invented, developed, used and advanced in order to achieve some other purposes (e. g. making work easier, increasing productivity, producing or consuming new products, improving services). And only in this respect (using technology as a means to achieve some purpose), does it make sense to speak of our technological capability, i. e. our compe-

tence/capacity to purposefully use technology. However, if we were not to use technology to achieve some purpose, then it would not make much sense to speak of our technological capability in this respect, but rather of how successful we are at achieving this purpose by using some other means (non-technological).

Technological capability is not the same as technology or as knowledge and skills of how to use a technology in order to produce a desired product. Technological capability is our competence/capacity to *purposefully* use technology and the necessary knowledge and skills.

Technological capability refers both to individuals and organizations/institutions – an individual as well as an organization/institution can have a technological capability. According to the National Research Council (1987), it is the technological capability of organizations that is relevant to management of technology. In the following, we will thus focus on the technological capability of organizations.

The technological capability of an organization refers to managing technologies (and technological knowledge and skills) in a way that guarantees effective and successful achievement of the purposes of an organization, where technology plays an important role. And since our experience with technology shows that technology is being invented, developed, used and advanced predominantly (but not exclusively) in companies, technological capability usually (but not exclusively) refers to successful management of technologies in companies. The technological capability of companies refers to the competence/capacity of companies to use technologies (as well as the knowledge and skills necessary for their proper use) in a way that consequentially guarantees value maximization and profits for investors. Janeš and Dolinšek (2007, 1411) stated that 'the technological capability of the company is the ability to effectively and successfully exploit the management of technology knowledge.' And since management of technology is a rather broad managerial practice (it covers many activities, functions and tasks in a modern corporation), then technological capability must also be a rather broad concept. Technological capability is much more than technology itself or technical knowledge on how to use certain machines, devices and processes to produce a desired product. According to our conceptualization, technological capability does not refer to machines or devices, in the sense that these would have technological capabilities (machines and devices have functions and different levels of performance), but it refers to organizations, especially to companies (and also to states) in the present economy.

They have and they develop technological capabilities. The technological capability of an organization is thus a managerial and organizational category – and not a mathematical, physical, biological, psychological or any other category.

In the following, we present a particular theoretical case, where technological capability is conceptualized in a much more narrowed, technical sense than ours. Gallon et al. (1995), namely, explain technological capabilities as 'technical capabilities providing direct support to the (creation of) product or service portfolio with unique value to customers.' These capabilities are then divided into:

- applied science capabilities (fundamental know-how derived from basic research),
- design and development capabilities (disciplines employed in converting a product idea into an operational reality),
- manufacturing capabilities (capabilities employed in, or directly supporting, established manufacturing or operations).

Gallon et al. (1995) stress that 'in modern organizations, the large majority of the capabilities that are critical to organizations are either technological or market interface capabilities. Most core competencies rely on technological and market interface capabilities. Technical competencies are especially important because they are more frequently able to cross market boundaries and can provide the basis for significant product superiority. In most organizations, only few areas of technical expertise have the right attributes to be worthy of the term core technical competency and even fewer have been developed by these companies to the level of excellence that is necessary to give them broad strategic value.'

Managing Technology

According to Khalil (2000, 51), technology is very important in interactions between the individual, society, and nature. Technological advances have major effects on each of these entities and are, in turn, influenced by them. Management of technology (hereafter, MOT) involves developing and understanding these relationships and dealing with them in a rational and effective manner. In 1987, the National Research council stated the following: 'Management of technology links engineering, science and management disciplines to plan, develop, and implement *technological capabilities* to shape and accomplish the strategic and operational objectives of an organization' (National Research Council 1987, 9). Khalil

(2000, 7) also says that management of technology is 'an interdisciplinary field that integrates science, engineering, and management knowledge and practice [...] Managing technology implies managing the systems that enable the creation, acquisition and exploitation of technology. It involves assuming responsibility for creating, acquiring, and spinning out technology to aid human endeavors and satisfy customers' needs.'

Based on the above conceptualizations of technology and technological capability, we propose the following conceptualization of management of technology: management of technology is organizing, coordinating and leading the use/handling of technology (and technological knowledge and skills) in an organization. Management of technology involves the following basic activities:

- planning of the use of technology,
- identification, selection and acquisition of technology,
- preparation and introduction of the use of technology,
- implementation, installation and control of the use of technology,
- motivating and maintaining the use of technology.

If an organization uses technology to achieve its purposes and goals, there is a need for effective management of technology in such an organization. An individual human itself does not manage technology and does not have the need to manage technology – it only uses (effectively or ineffectively) technology to achieve some purpose or goal. Technology is managed only in organizations where technology is being used, and management of technology is only one part of the general management of an organization. However, organizations in different socio-economic orders have different purposes/goals and management of technology in organizations depends on these particular purposes/goals, and also on the principles of each particular socio-economic order in which organizations are operative.

Management of technology is management of an effective and purposeful use of technology in an organization. Based on our conceptualization of technological capability (see above), management of technology is thus also developing and advancing the technological capabilities of organizations. For example, Janeš and Dolinšek (2007, 1411) stated that 'technological capability of the company is the ability to effectively and successfully exploit the management of technology knowledge.'

Some of the possible activities in the practice of MOT are also:

- technology auditing,

- scanning the technological environment and analyzing technology trends,
- technology forecasting and technology foresight,
- formulation of technology strategy,
- technology transfer,
- technology development.

The Need for Managing Technology Today: A New Paradigm

According to Khalil (2000, 54), the efficient utilization of technological resources is a critical aspect of today's management of corporations. In the modern way of life based on technology, the rational and productive use of available technology, materials, skilled workers, information, intellectual assets, and financial resources is crucial in providing a competitive posture for corporations.

Burgelman et al. (1998, vii) simply state that technology and innovation must be managed, since this is generally agreed upon by management scholars and managers. 'One key task of the general manager is to acquire, develop, and allocate an organization's resources. Technology is a resource of paramount importance to many organizations in today's competitive environment; managing this resource for competitive advantage entails integrating it with the firm's strategy' (p. 1). Management of technology must be a part of a firm's overall business strategy.

Our study of major companies in different material production sectors (e. g. energy, information technology, robotics) shows that innovative, advanced, leading-edge (possibly proprietary) technologies are today regarded as a decisive source of competitive advantage and consequentially value maximization and profits (see for example ExxonMobil 2008, 2009; iRobot 2009, Microsoft 2009). Technology is regarded as an element underpinning success across all sectors of these companies.

According to the International Association for the Management of Technology (IAMOT), technology is a large and growing part of every manager's daily experience – managers develop technology, use technology, buy technology and sell technology (Van Wyk 2004, 84). Technologies today are an integral factor that exerts influence upon all managerial disciplines (finance, accounting, human resource management, marketing, operations management).

The essence of today's MOT is in combining business management with science and engineering: a primary focus is on technologies in the

whole business process – from strategic planning concerning investment and development of new technologies to operative questions concerning development of products and technologies as well as their commercialization. A framework (model) of the technology management activities consists of identification, selection, acquisition, the exploitation and protection of technologies (Janeš and Dolinšek 2007, 1411).

MOT is very important today due to unprecedented and fast technological development. Managers daily face technological challenges, upon which they have to quickly and appropriately respond, and this requires new knowledge and brings new tasks. Research and development as well as inventions are important elements for advancing technological development, yet still more important is exploitation and commercialization of existing technologies.

Khalil (2000, 54) states that 'drastic changes in the business environment in the third millennium are expected. There is a search for new paradigms that are suitable for this new environment. New paradigms in management of technology are interdisciplinary – they draw upon knowledge from existing fields such as engineering, management, accounting, finance, economics, production, and political science.' There are today very dynamic conditions for manufacturing and service organizations, conditions dictated by changes in technology and by the global business environment. Major technological changes in the world's economy now include: rapid technological change and diffusion, increasing technological complexity, new computer-based service technologies, and globalization of technology-competition and markets. These require changes of the dominant paradigm by which the productive enterprise is managed. 'Management of technology focuses upon how technological change can be managed to improve the competitiveness of the business enterprise. This focus is resulting in some major alterations in the management paradigm by which competitive enterprises should be managed' (p. 66).

The modern practice of management of technology should take the following trends into account:

- production economies of scope are equally important with economies of scale, and production automation should be appropriately balanced between hard and soft automation (depending upon product volumes and product lifetimes),
- multi-core-technology product lines will have shorter product life-

times and should be planned as generations of products (paced by the most rapidly changing critical technology), and the organization must be flexibly organized for rapid and correct response,

- world markets and technology are now global, and enterprises should be globally based to 'think globally and act locally' (Khalil 2000, 68–70).

Based on conclusions of the National Science Foundation workshop on management of technology, Khalil (2000, 73) stresses that rapid change in technology will very likely intensify in the 21st century. The following changes are expected to occur:

- technological complexity is expected to increase,
- technology fusion will be more pronounced. Technologies from one discipline will cross-fertilize technologies of other disciplines, thus enhancing the level of performance of technology,
- a diffusion of information and communication technology will continue into the future. Mergers and acquisitions of information- and communication technology firms are expected to increase,
- the emerging technologies, particularly molecular biology and computer information technology, will have a major impact on industry and on all walks of life. Applications of genetic engineering, biotechnology and nanotechnology are expected to change existing industries and create new markets. These emerging technologies are expected to find many applications in the health industry, in agriculture, and in human and animal genetics,
- technology life cycles for high-tech industries are becoming much shorter. This trend will continue in the future, enabling closer linkage and better harmonization of business and technology strategies.

Conclusions and Discussion

In the paper, we provided our conception of technology that is very similar to other predominating conceptions of technology in the (management of technology) literature. However, some minor elements are present in our conception, which are not explicitly presented in other conceptions. We also clearly stated what our empirical base was, upon which we conceptualized technology. A question to be further investigated is whether our empirical criterion is whether we sufficient or should add some other relevant empirical material and accordingly modify our conception.

In the paper, we explained a general and principal relationship between technology and wealth in a society. While there is a lot of literature on the relationship between technology and economic growth, there is not so much literature on the fundamental relationship between technology and capitalism (and its forms of wealth) or technology and real-socialism (and its forms of wealth) or between technology and another past or possible future socio-economic order (and its forms of wealth). Economic growth is by itself a very abstract and dubious determination (organisms grow, while economic orders do not grow, but are instituted, executed, enforced, implemented), and in different socio-economic orders so called 'economic growth' means very different things.

Regarding our conception of technological capability, it should be stressed that this is only a proposed conception and that it is based on our previous conception of technology itself. Other researchers should examine our conception of technological capability and verify if this conception convincingly grasps technological practice and technological capability in modern companies. In their practice, companies and other organizations and institutions do not speak so much of technological capability (as they do of technology), so an organization's technological capability is more of a theoretical concept in the MOT academic field, albeit a fundamental one.

We live in a society of increasingly fast and various technological changes and advancements, so the challenges for modern MOT practice are thus also constantly changing. In the paper, we have presented some general and most notable challenges. However, this list could go on and on and could include more and more specific trends and challenges. One of the constant MOT tasks is to scan, analyze and foresee such challenges.

Notes

1 Facts about rapid technological advancements in the last decades are startling. To name only a few; there has been more information produced since 1960 than during the previous 5,000 years and information supply available to us doubles every 5 years (Pritchett in Khalil 2000, 2–3). Gordon Moore, a cofounder of Intel Corporation, has predicted that microchips will double in power and halve in price every 18 months (Isaacson in Khalil 2000, 3). Subsequently, Intel succeeded in fulfilling this prediction.

References

AMGEN. 2010. 'An Introduction to Biotechnology.' http://wwwext.amgen.com/science/biotechnology_introduction.html

Arnold, E., and B. Thuriaux. 1997. 'Developing Firms' Technological Capabilities. Technopolis Ltd.' http://www.technopolis-group.com/.../094_Capabilities_970707.pdf

Bell, E. R. J., D. R. Kingham, and A. Powell. 1992. 'Technology Audit: Methodology and Case Example.' Paper presented at Technology Transfer and Implementation Conference (TTI '92), London, 6–8 July.

Bhutto, A. 2008. *A Dynamic Technological Capability (DTC) Model for the Next Generation of Technology Evolution.* Nottingham: The Nottingham University Business School.

Boeing. 2009. 'The Boeing Company 2009 Annual Report.' http://www.envisionreports.com/ba/2010/27525ja10e/index.html

Burgelman, R. A., M. A. Maidique, and S. C. Wheelwright. 1998. *Strategic Management of Technology and Innovation.* 2nd ed. New York: McGraw-Hill / Irwin.

ExxonMobil. 2008. '2008 Summary Annual Report.' Http://ir.exxonmobil.com/phoenix.zhtml?c=115024&p=irol-reportsAnnual.

———. 2009. '2009 Summary Annual Report.' Http://ir.exxonmobil.com/phoenix.zhtml?c=115024&p=irol-reportsAnnual.

Fortune. 2010a. 'Fortune 500: Our Annual Ranking of America's Largest Corporations. Industries.' Http://money.cnn.com/magazines/fortune/fortune500/2010/industries/.

———. 2010b. 'Global 500: Our Annual Ranking of the world's Largest Corporations.' Http://money.cnn.com/magazines/fortune/global500/2010/full_list/.

Fusfeld, A. R. 1978. 'How to Put Technology into Corporate Planning.' *Technology Review* 80 (6): 51–5.

Gallon, M. R., M. S. Harold, and D. Coates. 1995. 'Putting Core Competency Thinking into Practice.' In *Management of Technology: The Key to Competitiveness and Wealth Creation,* ed. T. M. Khalil, 235–47. New York: Irwin Mcgraw-Hill.

Garcia-Arreola, J. 1996. 'Technology Effectiveness Audit Model: A Framework for Technology Auditing.' Master's thesis, University of Miami.

GegenStandpunkt. 1983. 'Die Konkurrenz der Kapitalisten.' http://www.gegenstandpunkt.com/vlg/konkurr/konkap.htm

iRobot. 2009. 'Annual Report on Form 10-K.' Http://investor.irobot.com/phoenix.zhtml?c=193096&p=irol-reportsannual.

Janeš, A., and S. Dolinšek. 2007. 'Technology Audit Model (TAM) and the Impact of Technology on Companies and Society.' Paper presented at the Seventh International Conference on 'Enterprise in Transition,' Bol-Split, Croatia, 24–6 May.

Khalil, T. M. 2000. *Management of Technology: The Key to Competitiveness and Wealth Creation.* New York: Irwin Mcgraw-Hill.

Lall, S. 1992. 'Technological Capabilities and Industrialization.' *World Development* 20 (2): 165–86.

Microsoft. 2009. 'Microsoft 2009 10-K Annual Report.' http://www.microsoft.com/investor/reports/ar09/10k_dl_dow.html

Mohhamad, A. P., S. Razaee, F. Shayegh, and F. Torabi. 2010. 'A Model For Technology Capability Assessment in R&D Centers.' Paper presented at the 14th International Oil, Gas & Petrochemical Congress, Teheran, 19 May. http://www.microsoft.com/investor/reports/ar09/10k_dl_dow.html

Nanophase. 2010. 'Technology.' http://www.nanophase.com/technology/dispersion.aspx?

National Research Council. 1987. *Management of Technology: The Hidden Competitive Advantage.* Washington: National Academy Press.

NewScientist. 2011. 'Technology.' http://www.newscientist.com/section/tech

Rubinstein, M. 1931. 'Relations of Science, Technology, and Economics Under Capitalism, and in the Soviet Union. Science at the Crossroads.' Paper presented at the International Congress of the History of Science and Technology, London, 29 June–3 July.

Rush, H., J. Bessant, and M. Hobday. 2007. 'Assessing the Technological Capabilities of Firms: Developing a Policy Tool.' *R&D Management* 37 (3): 221–36.

Sony. 2010. 'Technology: Sony's Technology Highlights.' http://www.sony.net/SonyInfo/technology/

Technology Review. 2011. 'Most Viewed.' http://www.technologyreview.com/

Tesar, G., S. Ghosh, W. A. Steven, and T. Bramorski. 2003. *Strategic Technology Management: Building Bridges between Sciences, Engineering and Business Management.* London: Imperial College Press.

Van Wyk, R. 2004. *Technology: A Unifying Code: A Simple and Coherent View of Technology.* Cape Town: Stage Media Group.

Zedtwitz, M., and J. Jin. 2004. 'The Process of Technological Capability Development in the Mobile Telephone Manufacturing Sector: A Case of Eastcom (China).' Paper presented at IAMOT 2004, Washington, 3 April.

Zeleny, M. 1986. 'High Technology Management.' *Human Systems Management* 6:109–20.

Competitiveness of Frontier Regions and Tourism Destination Management

Ksenija Vodeb

The competitiveness of border regions is often lower than the competitive ability of a country's interior regions. Mostly being areas that mark the end of one entity and the beginning of another, border regions demonstrate weaker economic performance. Tourism, as a method of development, provides opportunities to develop tourism destinations in places where tourism attractions and resources, and comparative and competitive advantages exist. This paper deals with models for assessing competitiveness in the field of tourism and destination management as a vital element in achieving a higher level of competitiveness for a tourism destination. Our research focuses on tourism supply providers in the border regions of Slovenia and Croatia. We assess their attitudes on tourism, regional competitiveness, and potential tourism destinations as the outcome of cooperation between the two countries. Results indicate the possibility of enhancing competitiveness through a strategic approach in planning and managing cross-border tourism destinations.

Key Words: tourism destination, competitiveness in tourism, tourism destination management, cross-border cooperation

JEL *Classification:* O10, M20

Introduction

There is no clear, standard definition of competitiveness or structural approach to understanding competition. According to Wei-Chang Hong (2008) there were published in refereed journals more than 4000 regular papers regarding the competitiveness from 1985 to 2006.

Competitiveness is a concept present in the modern business operations of all industries and sectors, and because of the indirect effect it has on the profitability of business entities, it is the focus of study and analysis for many researchers and professionals. Many authors seek to define this concept and describe its regularities and basic characteristics to make it easier to understand and apply in practice. For example, Michael Porter (1996, 24; 1997, 38; 1998, 3), one of the greatest names in

Dr Ksenija Vodeb is an Associated Professor at the Faculty of Tourism Studies, University of Primorska, Slovenia.

this field who has, for decades, sought to penetrate the essential truth of competitiveness, claims that competitiveness has become a central preoccupation of the states and industries of every nation.

Porter's generic competitive strategies (1996) were generally accepted in the theory of competitiveness until Poon (1993) introduced the tourism point of view. She is rather critical with respect to Porter's generic competitive strategies, since for her, these are inadequate tools to explore competitive success for tourism players. His analysis is, according to Poon, more applicable to the manufacturing sector than to services (Vanhove 2005).

All authors agree upon and venture from the same starting point: the changing environment. Research (Huang 2006; Jogaratham and Law 2006; Jurowski and Olsen 1995) has shown the environment in the sphere of tourism and hospitality to be uncertain, unstable and highly changeable. Given this state of high complexity, organisations must actively strive to carry out environmental scanning consistently. They must continuously ask themselves: 'What is happening around us, and how does it affect our business?' by collecting, analysing and interpreting data and information from political, socio-cultural, technological, environmental and competitive organisational domains (Teare and Olsen 1999, 105).

Despite numerous studies on and much debate about the competitiveness of tourism destinations, cross-border areas have been neglected for the most part. Specific reasons do exist, however, as to why it is essential to examine these regions more closely. These are (in our case) the abundance of tourism attractions in the observed area, the interest displayed by guests and tourism-supply providers, the level to which an integrated tourism product is interesting to third markets, and the opportunity of valorising borderland regions in compliance with the principles of sustainable tourism development.

Cross-border cooperation is of obvious importance for the mutual strengthening of the tourism industries of neighbouring countries (Grundy-Warr and Perry 2001, 64).

In this paper, we take a look at the possibilities of cross-border collaboration in enhancing the competitiveness of tourism destinations from the perspective of borderland tourism-supply providers.

Competitiveness Assessment Models

Because of the concept's remarkable pervasiveness and complexity, its actual occurrence will, to a substantial extent, depend upon the way it is

assessed. Ritchie and Crouch (1993, 27ff) conclude that certain aggregate measurements can be applied in general economic management, but are not very useful in analysing and managing international competitiveness in tourism. They report that studies on the factors used in defining and assessing the competitiveness of a country have uncovered the potential impact that these factors have on the ability of a country to compete on the tourism market, and on enhancing its integrative abilities for international competitiveness.

In Slovenia, competitiveness has been explored on the example of tourism and hotel companies (Nemec Rudež 2004, 45). Recently the competitive analysis for Slovenia as a destination was made using an integrated model. The result shows that Slovenia is more competitive in its natural, cultural and created resources, but less competitive in the management of tourism and, according to the integrated model, demand conditions, with both uncompetitive elements reducing the Slovenian tourism industry's ability to add value (Gomezelj Omerzel and Mihalič 2008).

Considering how interlaced tourism is with other activities and because of a tendency to either neglect or over-emphasise the indirect effects of tourism on the economy, some authors (Mihalič 2002, 2) call for caution in assessing the tourism competitiveness of any country. In current studies, the competitiveness, that is, the significance of tourism is analysed on the basis of physical indicators (number of overnights, number of guests), the tourist trade's share in the domestic product, and the importance of tourism for the country's balance of payments. The authors point out the difficulty in defining the tourism sector, because it comprises companies from various classes of the existing statistical classification, and often what is analysed is only the performance of hotel companies, and not the competitiveness of tourism mediators and organisers.

In an international setting, we can refer to Porter's competitiveness model from 1990, which has had a huge impact in the economic literature. His study is based on explaining why some companies in certain branches or market segments are capable of successfully competing with foreign rivals. Here, Porter distinguishes between the activities of individual companies and determinants, which he calls 'national advantages.' A company's performance depends upon the existence of competitive advantages (e. g. lower production costs or product differentiation). Companies need to develop generic strategies based on either of

the two determinants, while the selection of a strategy will be based on the response of management to the five factors of competitiveness (Five Competitive Forces Analysis) – the power of customers and suppliers, the threat of potential entrants and substitutes, and rivalry among companies (Porter 1998, 314).

The World Economic Forum has provided the so-called WEF model, which claims that every economy has, at its disposal, certain inputs or competitiveness factors, which, combined in a certain way, may generate useful output. These competitiveness factors include (Mihalič 2002, 3):

- domestic economic power (macro economic indicators of the economy),
- internationalisation (participation in international business),
- the government (support of government policies to competitiveness),
- finances (capital market development, quality of financial services),
- infrastructure (level of development, adequacy),
- management (innovativeness, profitable business),
- science and technology (scientific and research abilities, the success of basic and applicative research),
- people (the availability and qualifications of the work force).

This model has not been applied to the field of tourism.

The model of the greatest interest to us is the Calgary tourism competitiveness model developed by Ritchie & Crouch (1993, 48) mentioned earlier. Their model focuses on the following competitiveness factors:

1. Destination Appeal – how appealing or unappealing a destination is.
2. Destination Management – sales efforts and managerial efforts.
3. Destination Organisation – organisational structures, strategic alliances.
4. Destination Information – information system, research.
5. Destination Efficiency – price-to-quality ratio, productivity.

The authors presented the model in 1993 in the form of a hypothesis and conducted tests. The model is still being perfected.

The authors underline the importance of information as a basis for decision-making for tourism managers. Destinations that collect and use

information efficiently are deemed to have the ability of improving their competitive positions.

The Calgary Tourism Competitiveness model (Ritchie and Crouch 1993, 50) looks like this:

1. Destination prosperity = *fn* competitiveness (sector 1, sector 2, tourism . . .)
2. Tourism competitiveness (TC) = *fn* (how appealing or unappealing a destination is [Appeal])
   (destination management [Mgmt])
   (destination organisation [Org])
   (destination information [Info])
   (destination efficiency [Effic])
3. Appeal = *fn* (appealing, unappealing destination) [Attract] [Deter]
4. Mgmt = *fn* (marketing efforts, managerial efforts) [Mktg] [Manager]
5. Org = *fn* (Destination Management abilities, strategic alliances) [DMO] [Alliance]
6. Info = *fn* (internal management information systems, research abilities) [MIS] [Research]
7. Effic = *fn* (integrative experience, productivity) [IOE] [Prod]

The Keyser-Vanhove model of tourism competitiveness provides a greater opportunity for including external factors, in particular, government policies, into a competitiveness analysis. The general opinion among economists today is that while tourism may contribute to increasing the wealth of a country, practical examples warn us that this is not always necessarily so. This has to do with those destinations that are not successful in transforming tourism into a profitable industry or manage to do so only in the short run. Vanhove (2005, 115) points out that benefits from tourism development depend upon the competitive position of a country's tourism sector on the international tourism market. That is why he believes the first step in analysing competitiveness to be an analysis of a country's competitive position, which, in fact, involves analysing comparative advantages (factors). This is about identifying factors such as the vicinity of tourism generating markets, pristine nature, favourable prices, etc., which is followed by an analysis of tourism traffic indicators and an analysis of factors that are actually comparative advantages. The second step involves analysing the below factors (Vanhove 2005, 73):

- macro economic factors,
- supply factors,
- transport,
- demand factors,
- tourism policies.

This basis is used to identify the comparative advantages and weaknesses of a destination or country.

Mihalič (2002, 5) points out that quantitative indicators such as the number of overnights and the number of guests cannot be the basis of any serious economic analysis into the competitiveness and performance of the tourist trade. The evidence she provides to support this is the discrepancy between the foreign currency inflow index and the foreign-tourist overnights index, which shows that foreign currency inflow is, to a substantial extent, independent of the number of foreign-tourist overnights. She goes on to prove that a difference exists between the indexes of revenue, profit and guest numbers, confirming her hypothesis that tourism analysis cannot be based (exclusively) on physical-turnover indicators, because of the ability of tourism companies to generate a substantial part of their revenues from activities that are not directly related to tourists and tourist expenditure.

Tourism Destinations and Competitiveness

Destinations are defined as competitive tourism unities caught between markets and the needs of guests, local factors and companies or products (Bieger 2000, 35; Laws 1995, 56; Pechlaner 1999, 332; Kušen 2000, 314).

Magaš (2000, 58) defines a tourism destination as a spatial unit, appealing in terms of tourism, which can be shaped as a tourism site, tourism resort, tourism area or tourism region. This definition is given from a geographical perspective, whereas his definition from the contextual aspect of a tourism destination states (Magaš 1997, 21): A tourism destination is an optimum combination of fixed and variable factors and opportunities for tourism activities aligned with market preferences and independent of administrative boundaries.

A tourism destination, in its simplest terms, is a particular geographic region within which the visitor enjoys various types of travel experiences (Goeldner and Ritchie 2006).

Ritchie and Crouch (in Pedro Bueno 1999, 322) argue that competitiveness in destinations depends on their capacity (knowledge) to create conditions for market competition among enterprises.

Pechlaner (1999, 334), however, makes the point that only by creating unique competitive advantages is it possible to convince traditionally oriented destinations in the advantages of globalisation: the optimisation of organisation services, specialisation through cooperation, quality-offensive by suppliers and related industries, and lesser dependence on a small number of markets through internationalisation.

Determining a destination's competitiveness entails determining general conditions such as marketplaces, locations and companies. It is becoming clear, however, that destination competitiveness depends on the perspective of potential guests, and not on result-oriented indicators that provide only a view of the situation and offer very poor support to a destination's development. Finally, destination appeal also depends on the perspective of potential guests, making it necessary for a destination to exhaust all opportunities possible in effectively entering the marketplace and to impact on service quality by directly approaching service providers (Pechlaner 1999, 337f).

Preferences and trends of the tourism market are highly changeable but essential for the competitiveness of the destination. Campbell and Harald (2009) warned that there is an increasing demand for new products in tourism. Lower cost no longer means low service and low quality. Attention has moved towards providing high quality products at a reasonable price. Tourism has become a mature industry with a focus on what the tourist wants and with the emphasis on innovation as an instrument for creating new and memorable experiences.

The time for new a concept has come: the time for coopetition. It is beyond the competition and cooperation that we used to know earlier. It is an innovative approach in planning and organizing the tourism destinations, not only in border regions.

First introduced in 1995, coopetition is emerging as an important means to facilitate economic growth through tourism. The definition of this word is the need for cooperation among tourism destinations in order to better market the tourism product effectively and meet the competition at the regional or global level (Edgell, Del Mastro, Smith and Swanson 2008).

Tourism Destination Management and Competitive Strategies

When speaking of destination management, we are referring to destination management strategies, which are of great interest here and deserve to be looked at more closely.

Managing a destination as a combination of competitive products on

the marketplace calls for a direct relationship with entrepreneurs concerned with supply, on the one hand, and with organisational and financial preconditions, on the other, to facilitate the development of a competitive market and increase destination appeal (from the perspective of potential guests). Being different from the competition also guarantees guest satisfaction (Pechlaner 1999, 337).

Swarbrook and Horner (2001, 64) point out the importance of destination management, the responsibilities of which are divided among different organisations. Each of these, depending on their competencies and level of operations, contributes to achieving guest satisfaction in a destination. They include central government agencies, regional government agencies, associated public-private partnership organisations, private companies, and universities and faculties. Manete and Cerato (1999, 187) define destination management as the organisation of tourism products linked to market segments that are targeted based on tourism development strategies. Poon (1993, 288) argues that destinations should apply competitive strategies to accelerate the development of a new and sustainable tourism. These strategies involve:

- giving the environment top priority;
- placing tourism in a leading position;
- reinforcing distribution channels on the marketplace, and
- building a dynamic private sector.

The strategic approach is to ensure solutions with synergistic effects. When the strategic planning of a destination is grounded on the resource base that a given area possesses, in order to develop partnerships between different interest groups (the home public, government, industries) it is necessary that we single out the advantages with which we are competing on the market, that is, which we provide to our market segment with an equivalent scale of attractions and appeal that the destination has to offer (Hunt 2000, 137).

Survey Results and Discussion

This survey was conducted within the framework of a doctoral dissertation on the topic 'Tourism Management in Designing the Tourism Offering in Border Regions.' We explore the attitudes of tourism supply providers in the borderland regions of Slovenia and Croatia, the so-called decision-makers, on matters of cross-border cooperation and increasing

the competitiveness of the tourism offering by forming integrated joint tourism products.

The questionnaire consisted of 41 questions, some containing secondary questions, making a total number of 65 variables.

The hypothesis tested in this research reads:

H1 *The competitive ability of cross-border regions on the international market increases with the increase in the degree of cooperation.*

The questionnaire contained ten contextual sets of questions used to assess the attitudes and opinions of our targeted respondents. A five-point Likert scale was employed for the measurement of notions.

The questionnaire used to collect data was self-administered. The survey was simultaneously conducted in all seven borderland areas between Slovenia and Croatia according to the number of addresses of tourism-supply providers obtained over the Internet. The planned sample for Croatia consisted of 272 respondents. We collected 68 properly completed questionnaires, giving a 25% response rate. The planned sample for Slovenia consisted of 327 respondents. The response rate was 22. 6% with only 74 properly completed questionnaires collected. This fairly low response rate is attributed to changes of addresses and activities, as well as to a lack of interest for participating in the surveys, as we learned from telephone calls to most of the respondents who failed to send us a completed questionnaire.

The questionnaire primarily targeted 'small-scale' tourism-supply providers (owners of hotels, restaurants, holiday-flats, motor-camps, private farms; tourism associations, cultural clubs; airports; nature park managers; sports-equipment rentals in a destination, etc.). We found their addresses on the Internet, as part of the tourism offering of individual regions. Addresses of all tourism-supply providers were taken into consideration providing they met the established criteria (being located in the border regions and providing any type of tourism offering).

The data analysis methods can be divided into two groups:

- data analysis using factor analysis, and
- basic statistical methods (descriptive statistical methods, mean values and frequencies).

In factor analysis we explore the association among variables by seeking to reveal a new number of variables (smaller than the number measured) representing that which is common to the variables examined. In our case, the objective was to identify the variables affecting cross-border

TABLE 1 Data for Croatia – tourism in the destination

Item	AV	1	2	3	4	5
1. attitude on development	4.01	1.5	5.9	11.8	51.5	29.4
4. tourism's impact on development	4.70	0	0	0	29.4	70.6
21. involvement of residents in decision-making on tourism	4.30	0	1.5	1.5	61.8	35.3
22. tourism strategy	3.45	1.5	13.2	29.4	50	5.9

TABLE 2 Tourism issues in the destination

Item	AV	1	2	3	4	5
3.1 too few attractions	2.88	11.8	32.4	22.1	23.5	10.3
3.2 traffic links	2.33	33.8	26.5	19.1	13.2	7.4
3.3 access to information	2.44	23.5	32.4	26.5	11.8	5.9
3.4. distinctiveness of the destination	2.51	23.5	29.4	25	16.2	5.9
3.5 identity	2.48	25	23.5	35.3	10.3	5.9
3.6 tourism services and facilities	3.11	11.8	22.1	23.5	27.9	14.7
3.7 negative attitude of residents	2	42.6	29.4	16.2	8.8	2.9
3.8 residents are not interested in being involved in tourism	2.35	23.5	38.2	23.5	8.8	5.9
3.9 information not made available to residents	2.58	19.1	30.9	30.9	10.3	8.8
3.10 other	2.73	7.4	14.7	75	2.9	0

cooperation. We tested variable grouping and the number of factors until an optimum result was achieved: the largest possible number of original variables in meaningful combinations and with high intercorrelations (over 0.40 in the factor matrix). Variables with the highest positive values were attributed to individual factors.

A factor analysis was made of all questionnaires (142). The descriptive part of data analysis was conducted separately for Slovene respondents and for their Croatian counterparts to allow for a comparison of average values.

We see that the item *tourism's impact on development* has the highest average value (AV) (4.70), with 70.6% of responses having maximum values (highly positive). This indicates that respondents are aware of the extent to which tourism can facilitate development in their region, i. e. they see tourism as a method of development.

With regard to tourism issues in their destinations, respondents gave

TABLE 3 Assessing destination competitiveness using the Calgary model

Item	AV	1	2	3	4	5
34.1 appeal	4.32	0	0	4.4	58.8	36.8
34.2 management	2.92	4.4	30.9	30.9	29.4	4.4
34.3 organization	2.66	10.3	35.3	35.3	16.2	2.9
34.4. information	2.88	4.4	25	50	19.1	1.5
34.5 efficiency	3.01	2.9	32.4	29.4	30.9	4.4

TABLE 4 Residents' attitudes towards tourism

Item	AV	1	2	3	4	5
24.1 the operations of most companies are tourism-related	3.57	5.9	27.9	4.4	26.5	35.3
24.2 residents want more tourists	4.17	2.9	5.9	10.3	32.4	48.5
24.3 local residents are not tolerant towards tourists	1.60	61.8	22.1	11.8	2.9	1.5
24.4. residents see no promising outlook for their involvement in tourism	2.05	44.1	26.5	11.8	14.7	2.9
24.5 regional competitiveness can be enhanced through cooperation	4.13	1.5	1.5	14.7	47.1	35.3

responses that differ highly, but show no substantial deviations. The item *services and facilities of the tourism offering* have the highest AV (3.11). Interestingly, in most responses (42.6) the item *negative attitude of residents* was rated as 1 (*Not an issue at all*). Generally speaking, not one of the items measuring *Tourism Issues in the Destination* showed any visible deviations.

In assessing destination competitiveness according to the Calgary model, the highest AV was measured for the item *appeal* (4.32), for which 58.8% responded with a rating of 4 (*Satisfied*), and as many as 36.8%, with a rating of 5 (*Fully satisfied*). The item *efficiency* (AV 3.01) shows 32.4% of respondents to be dissatisfied. Some dissatisfaction is also evident with the items *management* and *organisation.*

The highest AV was measured for the item *residents want more tourists* (4.17), followed by *regional competitiveness can be enhanced through cooperation* (4.13). Almost half (47.1%) of all respondents gave the latter item a rating of 4 (*I largely agree*). About 48.5% agree that *residents want more tourists.* The sharpest deviation was recorded for the item *local residents are intolerant towards tourists,* with 61.8% of respondents opting for 1 (*I strongly disagree*).

TABLE 5 Data for Slovenia – tourism in the destination

Item	AV	1	2	3	4	5
1. attitude on development	3.82	0	13.5	16.2	44.6	25.7
4. tourism's impact on development	4.62	0	0	1.4	35.1	63.5
21. involvement of residents in decision-making on tourism	4.18	0	1.4	6.8	63.5	28.4
22. tourism strategy	2.95	5.4	24.3	41.9	25.7	2.7

TABLE 6 Tourism issues in the destination

Item	AV	1	2	3	4	5
3.1 too few attractions	2.83	18.9	18.9	33.8	16.2	12.2
3.2 traffic links	2.39	28.4	28.4	24.3	13.5	5.4
3.3 access to information	2.71	13.5	31.1	32.4	16.2	6.8
3.4. distinctiveness of the destination	3.01	6.8	31.1	29.7	18.9	13.5
3.5 identity	2.91	12.2	25.7	29.7	23	9.5
3.6 tourism services and facilities	3.06	9.5	31.1	20.3	21.6	17.6
3.7 negative attitude of residents	2.83	10.8	37.8	17.6	24.3	9.5
3.8 residents are not interested in being involved in tourism	3.22	12.2	16.2	21.6	36.5	13.5
3.9 information not made available to residents	3.16	12.2	13.5	35.1	24.3	14.9
3.10 other	3.00	5.4	4.1	82.4	1.4	6.8

In this dimension, the results recorded are very similar to those obtained from Croatian respondents. With an AV of 4.62, the item *tourism's impact on development* ranks first, with as many as 63.5% reporting this impact to be highly positive. The lowest AV was measured for the item *cooperation is planned for in the tourism strategy* (2.79), testifying to the poor knowledge of relevant information.

In measuring *Tourism Issues in the Destination,* no drastic departures from the results of Croatian respondents were observed. Indeed, the responses of the Slovene group are even more strongly divided, so that we cannot speak of having identified any particular problems. Sadly, the highest AV was measured for the item *residents not interested in becoming involved in tourism* (3.22), yet 36.5% of respondents perceive this item as an important tourism issue in their destinations.

Similar results were obtained in this dimension in both groups. The responses of the Slovene group to the item *destination appeal* (an AV of 3.89, and 59.5% of respondents reporting their satisfaction) are very close

TABLE 7 Assessing destination competitiveness using the Calgary model

Item	AV	1	2	3	4	5
34.1 appeal	3.89	1.4	2.7	18.9	59.5	17.6
34.2 management	2.89	8.1	23	44.6	20.3	4.1
34.3 organization	2.62	10.8	35.1	37.8	13.5	2.7
34.4. information	2.74	5.4	31.1	48.6	13.5	1.4
34.5 efficiency	2.82	8.1	29.7	37.8	20.3	4.1

TABLE 8 Residents' attitudes towards tourism

Item	AV	1	2	3	4	5
24.1 the operations of most companies are tourism-related	2.83	20.3	25.7	18.9	20.3	14.9
24.2 residents want more tourists	3.17	10.8	28.4	14.9	24.3	21.6
24.3 local residents are not tolerant towards tourists	2.56	24.3	25.7	27	14.9	8.1
24.4. residents see no promising outlook for their involvement in tourism	2.90	10.8	31.1	28.4	16.2	13.5
24.5 regional competitiveness can be enhanced through cooperation	3.97	1.4	8.1	18.9	35.1	36.5

to the ratings of their Croatian counterparts. Similarly, the item *organisation* received fairly low ratings, and an AV not exceeding 2.62.

The AV of the item *regional competitiveness can be enhanced through cooperation* is 3.97, with 35.1% of respondents agreeing, and 36.5%, strongly agreeing with this statement. The item with the lowest AV (2.56) is *residents are not tolerant towards tourists.* Still, it is higher than that obtained in the Croatian group (1.60).

No clear correlations between mean values and age and education groups were found. However a high correlation (0.79) was found between identity and distinctiveness of the destination as a tourism issue, (0.72) between assessment of collaboration experience and experiences in collaboration, (0.68) between the negative attitude of residents' towards tourism and residents interest in being involved in tourism as a tourism issue, and (0.63) between awareness of attractions in adjacent region and advantages of cross-border cooperation.

EXPLORATORY FACTOR ANALYSIS: DATA INTERPRETATION WITH SPSS PROCESSING

The SPSS program, Version 13 was used in factor analysis. All properly completed questionnaires (142 cases) were processed. The adequate

TABLE 9 Factor loading of individual items of cross-border cooperation dimensions

Item	F1	F2	F3	F4
Cooperation and integrated tourism offering				
13. considering collaboration	0.721			
17. assessment of collaboration experience	0.710			
16. experiences in collaboration	0.695			
8. willingness to collaborate	0.649			
18. ideas on integrated product	0.625			
11. being part of an integrated product	0.595			
7. advantages of cross-border cooperation	0.581			
10. increasing business through cooperation	0.576			
6. awareness of attractions in adjacent region	0.551			
12. compatibility of tourism offerings	0.550			
19. knowing potential strategic partners	0.541			
28. being more competitive as part of integrated product	0.527			
21. involving residents in decision-making regarding tourism	0.512			
5. previous involvement in cooperation	0.497			
24.5 enhancing regional competitiveness through collaboration in tourism	0.482			
33.4 representing interests as a function of tourism organizations	0.448			

Continued on the next page

number of correlations in the database matrix justified choosing factor analysis. The Bartlett Test, used to statistically test the existence of correlation among variables, showed important correlations within the correlation matrix. The value of the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was 0.814 for the variables selected. This is an excellent measure of sampling adequacy. The initial number of factors was selected with regard to theory-based expectations. Because the factors had not been empirically tested, their number was expected to drop. In choosing the number of factors, we took into account proper value, the percentage of explainable variances, and the scree plot. The scree plot showed that the possible number of factors ranged from two to five; however, because of proper values higher than 1, four factors were identified. For this number of factors and the final selection of variables, the explainable variances amount to 53.920%. Solutions us-

TABLE 9 *Continued from the previous page*

Item	F1	F2	F3	F4
Residents				
3.7 adverse attitude towards tourism		0.707		
3.8 residents not interested in becoming involved in tourism		0.702		
24.4 residents see no promising outlook for their involvement in tourism		0.617		
24.3 tolerance of residents towards tourists		0.588		
3.9 residents not informed on opportunities for becoming involved in tourism		0.510		
Assessing destination competitiveness				
34.3 destination organization			0.635	
34.2 destination management			0.562	
34.4 destination information			0.558	
34.5 destination efficiency			0.497	
Functions of destination tourism organisations				
33.3 marketing				0.528
33.1 developing ideas and destinations competitiveness strategies				0.520
33.2 developing and shaping the offering				0.496

ing five, four and three factors were also tested, but did not give such adequate results as the selected solution with four factors. In deciding which variables to keep, we were guided by the principle of communalities values (above 0.4) and high factor loading coefficients (above 0.3). The variables that remained are listed in table 9. The analysis process showed that it was necessary to exclude 25 variables of a total of 53 (taken into account in this analysis – their total number is 65, but 12 were processed descriptively) due to low communalities or low factor loading coefficients.

The four retained dimensions of cross-border cooperation (with 28 items), resulting as factors in the exploratory factor analysis are presented in table 9. We have named the first dimension Cooperation and Integrated Tourism Offering (F1); the second, Residents (F2); the third, Destination Competitiveness (F3), and the fourth, Functions of Destination Tourism Organisations (F4).

The third (F3) and fourth (F4) factors, together with two items (28

and 24.5) confirm the hypothesis stating that *the competitive ability of cross-border regions on the international market increases with the increase of the degree of cooperation.* This is, of course, confirmation that the respondents who were engaged in this survey believed that the competitive ability of cross-border regions increases with the increase in the cooperation degree.

Conclusion

Sometimes the competitiveness of border regions could be weaker than the competitiveness of, say, a country's central regions, because of the peripheral position of borderlands, the disruption that a border generally carries with all its connotations, and because of all issues arising out of this (depopulation, unemployment, poor development). Because tourism destinations are not necessarily restricted or disrupted by national and other borders, but their boundaries are determined by tourist perceptions, i. e. tourist needs and wants linked to a given tourism destination, we predict that in the borderlands between Slovenia and Croatia we will see an increase in tourism competitiveness providing effective cross-border cooperation. Through enhanced cooperation the specific cross-border tourism destinations could be created in places where tourism offerings are compatible. This is indicated by the results of our survey, in which we have measured the variable of the possibilities of enhancing destination competitiveness. As a result of this concept, we propose the development of an integrated tourism offering in places in which the offering, i. e. tourism attractions are compatible, and in which tourism demand exists. To this end, it would be beneficial to investigate the opinions and attitudes of tourists as yet another dimension, without which developing a tourism offering would be meaningless.

The results from the survey were analysed together for all seven cross-border areas because we wanted to catch the general condition of the issue. That is why we haven't got any different opinion from area to area, which represents a certain limitation in this research.

This survey has shown that, in the field of research, tourism has been recognised as a method of developing border regions. It also shows that competitiveness assessments using the Calgary model have given similar results on both the Croatian and the Slovene side. The awareness of respondents regarding the development function of tourism in border regions is at a very high level. Destination appeal received the highest rating, and destination organisation the lowest, in both cases. In other

words, there is no dispute regarding destination appeal. More problematic is the sphere of destination organisation, which comprises destination management and destination development strategies.

Our recommendations deriving from the results to tourism development stakeholders are to start cooperation between the tourism industry and local community, as both can gain much from reasonable joint tourism cross – border products. Of course, no instantaneous changes in market position are possible, but nor are they necessary. The local residents like to live in places that are attractive to tourists but should have a more active role in tourism development. We therefore suggest gradual enrichment of the tourism offerings regarding sustainability issues through cross-border cooperation and a joint development of cross border areas between Slovenia and Coratia.

References

Bieger, T. 2000. *Destination Management and Tourism Organization.* Munich and Vienna: Oldenbourg.

Campbell, C. T., and J. Harald. 2009. 'Developing Southern Mediterranean Tourism: The Interface Between Strategy and Sustainability.' In *Trends and Issues in Global Tourism,* edited by R. Conrady and M. Buck, 137–53. Berlin: Springer.

Edgell, D. L., M. A. Del Mastro, G. Smith, and J. R. Swanson. 2008. *Tourism Policy and Planning: Yesterday, Today and Tomorrow.* Oxford: Elsewier Butterworth Heinemann.

Goeldner, C. R., and J. R. B. Ritchie. 2006. *Tourism: Principles, Practices, Philosophies.* 10th ed. Hoboken, NJ: Wiley.

Gomezelj Omerzel, D., and T. Mihalič. 2008. 'Destination Competitiveness – Applying Different Models: The Case of Slovenia.' *Tourism Management* 29 (2): 294–307.

Grundy-Warr, C., and M. Perry. 2001. 'Tourism in an Inter-State Borderland: The Case of the Indonesian-Singapore Cooperation.' In *Interconnected Worlds: Tourism in Southeast Asia,* edited by T. Peggy, T. C. Chang, and K. C. Ho, 64–83. Oxford: Elsevier Science.

Huang, L. 2006. 'Building up a B2B e-Commerce Strategic Alliance Model under an Uncertain Environment for Taiwan's Travel Agencies.' *Tourism Management* 27 (6): 1308–20.

Hunt S. D. 2000. *A General Theory of Competition, Resources, Competences, Productivity, Economic Growth: Marketing for a new Century.* Thousands Oaks, CA: Sage.

Jogaratham, G., and R. Law. 2006. 'Environmental Scanning and Information Source Utilization: Exploring the Behaviour of Hong Kong Hotel

and Tourism Executives.' *Journal of Hospitality and Tourism Research* 30 (2): 170–90.
Jurowski, C., and M. D. Olsen. 1995. 'Scanning the Environment of Tourist Attractions.' *Journal of Travel and Tourism Marketing* 4 (1): 71–96.
Kušen, E. 2000. 'Skrb za turističku atrakcijsku osnovu: postojeće stanje i metodološki okvir.' *Turizam* 48 (3): 313–34.
Laws, E. 1995. *Tourism Destination Management: Issues, Analysis and Policies.* London: Routledge.
Magaš, D. 2000. *Razvoj hrvatskog turizma: koncepcija dugoročnog razvoja.* Rijeka: Adamić.
———. 1997. *Turistička destinacija.* Opatija: Hotelijerski fakultet.
Manete, M., and M. Cerato. 1999. 'Razumijevanje destinacije kao sustava: prijedlog metodologije.' *Turizam* 47 (3): 188–210.
Mihalič. T. 2002. 'Konkurenčnost slovenskega turističnega gospodarstva.' http://www.sigov.si/zmar/sgrs/diskusij/turizem.html
Nemec Rudež, H. 2004. *Intelektualni kapital v slovenskih turističnih podjetjih.* Ljubljana: Ekonomska fakulteta.
Pechlaner, H. 1999. 'Konkurentnost alpskih destinacija između pritiska tržišta i problema prilagođavanja.' *Turizam* 47 (4): 332–44.
Pedro Bueno, A. 1999. 'Konkurentnost u turizmu i uloga Španjolske Državne uprave: primjer pokrajine Valencije.' *Turizam* 47 (4): 316–32.
Poon, A. 1993. *Tourism, Technology and Competitive Strategies.* Wallingford: CAB International.
Porter, E. M. 1996. *The Competitive Advantage of Nations.* New York: The Free Press.
———. 1997. *La strategia competitiva – analisi per le decisioni.* Translated by G. Lorenzoni. Bologna: Editrice Compositori.
Porter. M. E. 1998. *The Competitive Advantage of Nations.* London: Macmillan.
Ritchie, J. R. B., and G. I. Crouch. 1993. *Competitiveness of International Tourism: A Framework for Understanding and Analysis; Competitiveness of Long Hould Destination.* St. Gallen: AIEST.
Swarbrook, J., and S. Horner. 2001. *Business Travel and Tourism.* Oxford: Butterworth-Heinemann.
Teare, R., and M. Olsen. 1999. *International Hospitality Management: Corporate Strategy in Practice.* London: Longman.
Vanhove, N. 2005. *The Economics of Tourism Destinations.* Amsterdam: Elsevier; Boston: Butterworth-Heinemann.
Wei-Chiang Hong. 2008. *Competitiveness in the Tourism Sector: A Comprehensive Approach from Economic and Management Points.* Heidelberg: Physica-Verlag.

Human Capital Constraints in South Africa: A Firm-Level Analysis

Ewert P. J. Kleynhans
Johannes Riaan Labuschagne

This paper examines human capital constraints in the South African economy, and the austerity of these constraints on firms in the country. The two key human capital constraints explored in this article are the inadequately educated workforce and labour market distortions. Regression analysis was applied to examine determinants of increased labour productivity in manufacturing firms. Education and labour market distortions were found to have a varying influence on output per worker. Principal Component Analysis (PCA) of the explanatory variables achieved similar results. This study found that the highest percentage of the total variance is explained by latent variables that incorporate education, training, compensation, region and Sector Education Training Authority (SETA) support and effectiveness.

Key Words: human capital constraints, productivity, efficiency, labour, education, manufacturing, South Africa
JEL *Classification:* D24, J24

Introduction

Since 1998, the government has shown a renewed commitment to improve human capital in South Africa. Investment in education has since received more funding than any other function in government (National Treasury 1999–2010). Recent Global Competitiveness Reports reveal, however, that an inadequately educated workforce and restrictive labour regulations are the biggest threats to South Africa's competitiveness (Schwab, Porter and Lopez-Claros 2006, 334). Fedderke (2006, 26) also states that in South Africa, human capital accumulation contributes less towards economic growth than in several other countries, and that the lack of quality education plays a major role in this phenomenon.

Gary Becker, Murphy and Tamura (1990, S13) regard human capital as embodied knowledge and skills. The accumulation of human capi-

Dr Ewert P. J. Kleynhans is a Professor at the School of Economics, North-West University, South Africa.

Johannes Riaan Labuschagne is a Research Associate at the School of Economics, North-West University, South Africa.

Managing Global Transitions 10 (1): 69–86

tal leads to economic development because economic development depends on advances in technological and scientific knowledge. Human capital can also be defined as all acquired characteristics of workers, as units of labour, which make them more productive (Filler, Hamermesh and Rees 1996, 64). For the purpose of this study, the concept of human capital is depicted as both the unequal quality of labour between competing firms and constraints within the labour market. Some economic growth accountants, like Fabricant and Solow (as quoted by Griliches 1997, 331), suggest that economic growth is not only explained by conventional labour and capital measures, but also by the changing quality of the labour force. Similarly, this current study argues that 'human capital' is responsible for changes in total factor productivity and ultimately output among competing manufacturing firms.

The South African labour market is characterised by sharp segmentation, high levels of unemployment and relatively low informal employment. Rogerson (2008, 75) states that the reason for this could be that South Africa's regulatory compliance cost is higher than in other developing countries. The main problem is the perception that over-protective labour regulations deter employees from employing additional workers, and that this increases the costs associated with employment. International experience also indicates that flexible labour market characteristics and sufficient state support are some of the main determinants of employment and productivity (Natrass 2003, 15). This paper aims to determine the impact that the above-mentioned constraints have on firms in the South African manufacturing sector.

The next will review the relevant literature and motivate the perspective of this study, while the third discusses the survey and its analysis, describing the severity of these constraints. In the fourth section, regression analysis will be estimated on enterprise survey data collected by the World Bank. The fourth will also contain a Principal Component Analysis (PCA) to determine underlying trends in the explanatory variables used in the regression analysis. The last section will contain concluding remarks and a summary on all the relevant findings of this paper.

Literature Study and Theoretical Rationale

In economic theory, the Solow growth model explains that increases in savings and technological innovation lead to higher levels of output, investment and capital per person (Colander and Gamber 2002, 142). The endogenous growth theory differs from the Solow model in that inputs

are defined more broadly in order to encompass accumulated capital supply and 'human' capital.

According to Cypher and Dietz (2009, 224), the 1950s and 1960s were periods of optimism in terms of global convergence. Economic models suggested that slower population growth and rapid investment in physical and human capital could in the long run contribute to convergence. However, Barro and Sala-I-Martin (1992, 242) found a divergence between countries from the nineteen seventies and eighties onward.

To explain how investment in education forms part of human capital, Schultz (1960, 571) proposed that education should be treated as an investment in man and the consequences as a form of capital, in other words 'human capital'. Efforts by government to promote small and medium-sized businesses (SMMEs) have mainly three pillars: to promote entrepreneurship, to create a fertile environment and to increase competitiveness and capacity (Rogerson 2008, 61). Improvements in human capital underlie all three these pillars, and explain the importance of human capital in business development.

Survey work done by Chandra et al. (2001, iv) revealed that in 1999, 30 to 45 per cent of SMMEs indicated a skills shortage. Only 24 to 30 per cent of firms with more than five workers had formal skills training, and ten per cent of firms with fewer than five workers had formal skills training. Kraak (2003, 678) explains that the number of specialised skilled graduates (e. g. engineers and technicians) is extremely low when taken into account that enrolment has shown dramatic increases.

While most studies on human capital focus on the supply and demand trends of skilled individuals and government programmes, this study considers the influence that human capital development has on productivity (output per worker) in South African firms. The following section describes the survey and the data that were utilised in the current study.

Analysis of Firms in the World Bank Survey

This analysis is based on data gathered by the World Bank enterprise survey on productivity and investment climate in South Africa. The survey targeted establishments located in the cities of Johannesburg, Cape Town, Port Elizabeth and Durban in the following industries (according to ISIC revision 3.1): all manufacturing, construction, retail, hospitality, transport, storage, communication and computer-related activities. After careful consideration, four industries were eliminated for the pur-

TABLE 1 Labour regulations and workforce education as obstacles

	Workforce education			Labour regulation		
	Small	Medium	Large	Small	Medium	Large
No	67	49	41	75	59	47
Minor	20	23	25	15	23	30
Moderate	5	19	20	5	10	18
Major	5	7	11	5	6	4
Severe	3	2	3	0	2	1

NOTES Based on World Bank survey and authors' own calculations.

pose of this study. The analysis will focus on manufacturing establishments and therefore wholesale, retail, hotel and IT establishments have been eliminated from the dataset. For the purpose of this study, a sample of 720 establishments will be used to analyse constraints and developments among South African manufacturers. Next, the severity of these constraints will be considered along with human capital development.

The requirement for establishments to be included in the survey was a minimum of five full-time paid employees. To further distinguish between small, medium and large companies, scales were introduced. Small-sized companies ranged between five and 19 employees, medium-sized between 20 and 99 employees and large-sized companies with 100 or more employees. Small establishments formed 34.5 per cent of the sample population, while medium and large-sized establishments represented 39.9 per cent and 25.6 per cent respectively.

The survey determined obstacles that firms face in doing business. Table 1 shows that firms in the survey did not experience immense problems with labour regulations or labour force education. The majority of small, medium and large firms indicated that these two aspects serve as either no or as minor constraints. These categories of constraints are based on perception, with the variables either having no constraint (or impact), or a limiting negative impact on firms in the survey. Regression analysis revealed that the quality of the workforce (measured as educational attainment) has a positive relationship with output per worker in manufacturing firms. The coefficients for labour regulations are not statistically significant and will receive attention later.

Although the global competitiveness index, as well as other authors like Kleynhans (2006, 58), indicated that labour regulations and inadequately educated workers are the biggest obstacles facing South Africa,

TABLE 2 The top six obstacles

Obstacles	Firm Size		
	Small	Medium	Large
Crime	26	35	32
Access to finance	8	6	3
Corruption	5	7	6
Electricity	25	16	16
Poor educated workforce	3	10	10
Labour legislation	6	5	8

NOTES Based on World Bank survey and authors' own calculations.

this survey found slightly different evidence. Further evidence revealed that crime and electricity costs are the biggest threats to firms in the survey (see table 3). Next were inadequately educated workers and labour regulations. In the following section, human capital development will be assessed via training and SETA (Sector Education and Training Authority) initiatives.

HUMAN CAPITAL DEVELOPMENT: TRAINING AND SETA SUPPORT

The biggest problem in analysing the effectiveness of human capital development initiatives, such as Sector Education Training Authority (SETA), is the lack of quality data. Rogerson (2004, 769) explains that discrepancies between national and provincial sources make findings and analysing data difficult. The majority of studies on human capital have been done by using survey data on a firm level across the country. This section compared findings from this study with evidence from other relevant studies on human capital development and training.

Large firms enjoyed more support from SETA, according to table 3, and are more likely to have official training programmes. Of small firms in the survey, only 27.4 per cent have formal training programmes, while for medium and large establishments, the figure is 47.4 and 70.8 per cent respectively. The majority of firms indicated that they spend between one and two per cent of their total sales on training. Seventy per cent of large establishments have formal training programmes, but only 26.5 per cent enjoyed SETA support. For small and medium-sized establishments, the figure was 4.8 and 11.8 per cent respectively.

The need for 'learning led' competitiveness has become a global phe-

TABLE 3 Average training programme and SETA support (percentage)

Item	Small	Medium	Large
Training programme(s)	27.4	47.4	70.8
Cost of training programme (as 1 to 2 % of sales)	19.4	35.2	50.2
SETA support	4.8	11.8	26.5

NOTES Based on World Bank survey and authors' own calculations.

nomenon, and changing ideas and environments pose as the biggest challenge to establishments. Education, training and experience form the most important aspects of competitiveness for all types and sizes of firms (Rogerson 2008, 61). The World Bank assessment of national SMME (Small, Medium and Micro Enterprises) programmes in 2006 indicated that it has not been successful in South Africa. Findings in this report identified an absence of training and education as the main stumbling blocks (World Bank 2006, 4).

Survey work done by Chandra et al. (2001, iv) revealed that during 1999, 30 to 45 per cent of SMMES indicated a skills shortage. Only 24 to 30 per cent of firms larger than five workers had formal skills training, and ten per cent of firms with fewer than five workers had formal skills training. The most worrying aspect is that the amount spent on crime prevention was bigger than the amount spent on training. Establishments did not experience labour regulations as a constraint, as they just reduced their number of permanent employees. Chandra et al. (2001, 41) also found usage and awareness rates of national training assistance programmes to be five and eighteen per cent respectively.

Bhorat and Lundall (2004, 1039) found evidence that in-house training schemes were preferred above outside training schemes. Eighty-four per cent of firms in this survey invest in in-house training programmes, while the figure for outside training was twenty-six per cent. The lack of formal evaluation in these programmes also generates questions about the quality of these training practices.

Firms that obtained SETA support were asked to describe the effectiveness of the support they received, and this will next be reported.

Table 4 indicates mixed reactions to SETA's effectiveness and on average it seems that SETA support has very little influence, which is neither effective nor ineffective. Large firms experience more support from SETA; however, close to twelve per cent of the respondents reported that SETA was in fact ineffective or very ineffective.

TABLE 4 SETA effectiveness

	Small	Medium	Large
Very effective	3.0	3.9	3.8
Effective	1.6	5.9	11.1
Neither effective nor ineffective	3.0	5.8	14.0
Ineffective	0.7	1.0	6.5
Very Ineffective	0.0	2.0	5.0

NOTES Based on World Bank survey and authors' own calculations.

Results from the regression analysis also indicate that SETA support has no significant influence on output levels in manufacturing firms in the survey. Evidence from this paper and work done in other studies show that SETA is an ineffective vehicle for promoting workplace education and training.

Empirical Analysis of the Quality of Human Capital

A variety of approaches can be found in the literature that explains human capital and its role in economic growth. Two main features that surface in the majority of the studies surrounding human capital include the quality of education and labour market distortions. Those studies that focus on education identify four aspects that influence human capital, which include quantity, quality, inequality and institutional differences. Work done by Barro (2001), Checchi (2006) and Dessus (2001) explains each one of these aspects.

Labour market distortions, on the other hand, can also be divided into four categories that influence human capital, namely labour market rigidity, inappropriate bargaining, industry concentration and the mispricing of labour. These are the four key aspects that explain the role that labour market distortions may have on human capital. Authors who have all described these aspects intensively are, for example, Fedderke (2005), Griliches (1997), Kingdon and Knight (2007) and Moll (1996), to name a few.

This section aims to determine the influence that the above-mentioned constraints have on manufacturing firms in South Africa. The following sections will establish the influence that these human capital constraints have on productivity and output in manufacturing firms. Firstly, the estimation of the regression equation will be explained, followed by the regression results and a Principal Component Analysis.

ESTIMATION OF THE MULTIPLE REGRESSION EQUATION ON HUMAN CAPITAL

This section of the study aims to determine to what extent variations of the contributors to human capital can explain the variations in the output per worker. The dependent variable (Y) in this regression represents output per worker (total sales/total workforce). The independent or explanatory variables (Xs) will coincide with variables that are found in the broad literature on human capital as described in the fourth section above. Variables that represent educational attainment and labour market distortions will be created and used in the regression analysis. Some of the explanatory variables can also further be divided into categories, and dummy coding will be used to distinguish between them.

Equation (1) includes all ten of the explanatory variables selected for the regression equation. To obtain the best possible fit, the equation has been transformed into a Log-linear functional form. This type of model is widely applied in the human capital literature (Asteriou and Hall 2007, 164).

$$\begin{aligned}\ln Y\ (\text{output-per-worker}) &= \beta_1 + \beta_2\ (\text{managers'-education}) \\ &+ \beta_3\ (\text{production-workers'-education}) + \beta_4\ (\text{labour-regulations}) \\ &+ \beta_5\ (\text{training}) + \beta_6\ (\text{SETA-support}) + \beta_7\ (\text{SETA-effectiveness}) \\ &+ \ln\beta_8\ (\text{compensation-production-workers}) \\ &+ \ln\beta_9\ (\text{compensation-managerial-workers}) \\ &+ \beta_{10}\ (\text{competition}) + \beta_{11}X\ (\text{location}) + \varepsilon_i. \qquad (1)\end{aligned}$$

Multiple regression analysis estimates a line that best fits the data and has the smallest possible residual values. The model, as indicated in equation 1, was estimated in the following way. In the SPSS software programme, the backward mode of the stepwise method of regression was selected. This mode is preferable to the forward mode due to its suppressor effects (Field 2005, 161). This method yielded the following results; there is a less than 0.1 per cent chance that the large F-ratio (20.08) happened by chance alone, because $p < 0.001$ (Field 2005, 190). The coefficient of determination (R^2) indicates that 48 per cent of the variability of output per worker is explained by the explanatory variables in this model. The adjusted R^2 value of 45.6 per cent is close to the model's R^2, and indicates that this model is a good generalisation of the dependent variable.

Field (2005, 189) suggests that a Durbin Watson value (in this case 1.685) close to two satisfies the Classical Linear Regression Model (CLRM)

assumption of independent errors. Next, the regression coefficients of table 5 will be discussed, and the significance of each variable will be explained.

REGRESSION RESULTS

Table 5 is a summary of the regression coefficients. The *b*-values (B) will be used to explain the results obtained from this regression. Variables with an asterisk (*) next to them indicate that the specific variable is significant at a five per cent level (or $p < 0.05$). This shows that the *b*-value is significantly different from zero, and not equal to zero as described in the null hypothesis. The Variance Inflation Factor scores (VIF) in the last column indicate whether an explanatory variable has a strong linear relationship with other explanatory variables. This measure is used to detect multicollinearity in the model. This model does not suffer from multicollinearity, as the VIF scores are all less than ten (Field 2005, 175).

Managers' education: For this variable, dummies were included. This was to distinguish clearly between the different levels of education. The *b*-values show that, compared to managers with primary education, secondary education and training is negatively related to the dependent variable (output per worker). Higher education seems to be positively related to the dependent variable, although only the MBA (Master's of Business Administration degree in South Africa) dummy is significant.

Production workers' education: The survey analysis found that on average, production workers have between seven and twelve years of education. This might explain why, relative to the reference group of zero to three years of education, production workers with between seven and twelve years of education have a positive relationship with output per worker. None of the dummies were statistically significant though.

Labour regulation as an obstacle: in the third section, it was shown that on average labour regulations do not pose a major obstacle. The coefficients suggest that when labour regulations pose a minimal or moderate obstacle, the dependent variable decreases. Large firms were also shown to experience more difficulty with labour regulations than small and medium-sized firms. The positive relationship between labour regulations as a major or severe obstacle and the dependent variable might be explained by the fact that large firms are better equipped to deal with labour regulations. However, none of these variables are significant at the five per cent level and these assumptions are made without absolute cer-

TABLE 5 Regression coefficients

Item	B	Std error	VIF
Constant	1.904	0.214	—
Managers' education			
Secondary education	−0.073	0.077	3.976
Training	−0.022	0.073	5.409
Some university	0.066	0.077	3.954
Graduate	0.136	0.074	5.667
MBA (South Africa)	0.191*	0.082	3.489
MBA (foreign)	0.097	0.102	1.907
Post-graduate (South Africa)	0.157	0.110	1.762
Post-graduate (foreign)	0.341	0.215	1.139
Labour regulations			
Minimal obstacle	−0.025	0.035	1.190
Moderate obstacle	−0.059	0.048	1.178
Major obstacle	0.039	0.064	1.078
Severe obstacle	0.052	0.136	1.065
Production workers education			
4 to 6 years	−0.006	0.070	3.196
7 to 12 years	0.044	0.064	4.878
≥13 years	−0.057	0.075	2.745

Continued on the next page

tainty. The reference group for this variable is labour regulations as no obstacle.

Training programme and Sector Education Training Authority (SETA) support: The existence of training programmes has a negative relationship with the dependent variable, while SETA support has a positive relationship. These variables are both statistically insignificant. It is therefore not clear whether the presence of training programmes or SETA support influences the dependent variable.

SETA effectiveness: SETA support was on average insignificant, being neither effective nor ineffective. The coefficients show that SETA effectiveness varies much. SETA support contributes to the biggest increase in the dependent variable. An interesting point is that SETA support that is very effective has a negative relationship with the dependent variable, and is statistically significant. SETA support that is ineffective also has a negative relationship with worker output, but this coefficient is not statistically significant. The influence of SETA effectiveness on the dependent variable is therefore unclear, as the reference group for this variable is SETA support that is very ineffective.

TABLE 5 *Continued from the previous page*

Item	B	Std error	VIF
Training			
Yes	−0.013	0.034	1.588
SETA *support*			
Yes	0.116	0.087	4.610
SETA *effectiveness*			
Very effective	−0.273*	0.116*	2.486
Effective	0.044	0.106	3.141
Neither effective nor ineffective	0.074	0.061	1.411
Ineffective	−0.063	0.100	1.370
Compensation			
Production workers	0.635*	0.056*	1.800
Managerial workers	0.254*	0.055*	1.823
Location/Region			
CAPE TOWN	0.117*	0.053*	2.147
JOHANNESBURG	0.216*	0.044*	2.432
PORT ELIZABETH	0.112	0.063	1.624
Competition			
1	0.178*	0.070*	1.510
2 to 5	0.085	0.048	2.838
>5	0.115*	0.046*	2.948

NOTES $R^2 = 48\%$, * $p < 0.005$.

Compensation of production and managerial workers: Both these variables have a positive relationship with the dependent variable, and are statistically significant. A one unit increase in the compensation of production workers yields a greater increase in output per worker than that of managerial workers. The study also found a large compensation differential between production workers and managerial workers in the survey.

Competition: The coefficients for this variable suggest two scenarios. Firstly, firms that have a single competitor have the highest positive relationship with the dependent variable. This may represent firms that are monopolistic, as the reference group refers to firms with no competitors. Secondly, where there are more than five competitors in the same market, a positive relationship exists with the dependent variable. This implies that increased competition has a positive impact on productivity, as sales output per worker increases. This relationship is also statis-

tically significant, but smaller than in the first scenario. Where competition takes place between two to five firms, the coefficient is positive but not statistically significant.

Location (Region): This variable shows that compared to Durban, firms in Johannesburg and Cape Town have a greater relationship with the dependent variable. These dummies are also statistically significant. For Port Elizabeth, the relationship is also positive but the coefficient is not statistically significant. Manufacturing output in this survey is also location biased. Manufacturing firms in Johannesburg achieve much greater levels of output per worker than those in the other three cities.

This corresponds well with findings about increased industry concentration in the South African economy. Fedderke and Szalontai (2005, 9) found that the top five per cent of firms produce an increasing fraction of total output in various industries (up to 85 per cent in some industries). In a separate study, Naudé and Gries (2004) found that in South Africa, eighty-five per cent of manufactured exports come from twenty-two out of the possible three-hundred-and-fifty-four magisterial districts. In a study done by Naudé (2006, 14), it was found that only KwaZulu-Natal (Durban area) and Gauteng (Johannesburg) were export orientated, and that the ability to successfully manufacture goods in only a few areas caused migration to these areas where industries are more densely situated.

In explaining this anomaly, international and national studies have indicated several potential contributing factors towards increased industry concentration. These factors include transport cost, infrastructure, specialisation, ports, technological spill-overs, resource endowments and other location essentials (Naudé 2006, 2).

The following section will apply Principal Component Analysis to generate more information on the subject matter regarding the quality of human capital in South Africa.

Principal component analysis (PCA)

Factor analysis is used to measure aspects that cannot be directly measured. This analysis determines whether different variables are driven by the same underlying trend (latent variable). This section applies the same variables used in the previous section, and aims to identify groups or clusters of variables. These groups of variables (also called factors) will then also be used in a regression analysis. The dependent variable (output per worker) in this regression analysis will be exactly the same as in

the previous section. It should be noted that variables, which measure the same underlying dimension or different aspects of the same dimension, should not be entered into the analysis simultaneously. Instead, only one variable should be entered into the analysis. Therefore, the following two variables have been omitted from the analysis: production workers' level of education and production workers' compensation. It is assumed that these variables measure the same underlying trend as the variables that measure the managers' level of education and compensation.

After running the Principal Component Analysis in SPSS, the KMO and Bartlett's test produced a score of 0.677. Field (2005, 648) suggests a minimum score of zero point five, and that a score close to point seven is a good score for this test. This test is also significant at the five per cent level ($p < .005$), and indicates that there is some relationship between the variables. After factor extraction, the rotation sums of squared loadings indicate that three factors are present. These three factors also cumulatively explain 60.7 per cent of the total variance. Factor 1 explains 29.6 per cent of the total variance, while Factors 2 and 3 explain 18.5 per cent and 12.6 per cent of the total variance respectively. After selecting an Orthogonal rotation (varimax) the rotated component matrix was estimated (table 6).

This matrix shows the factor loadings for each variable onto each factor. There are two things to consider about this matrix. Firstly, factor loadings of less than 0.4 are not displayed. This is the reason why there is no factor loading for the variable labelled 'labour regulations'. This variable does not load onto any of the three factors, and has little or no connection with the other variables. Secondly, the variables are listed according to the size of their factor loadings. Note that these variables can either have a positive or negative loading, and the number of variables that load onto each factor differs.

The next step is to identify common themes for all three factors. The variables that load onto Factor 1 all seem to relate to training and SETA involvement. Variables that load onto Factor 2 relate to the level of the managers' education, compensation as well as the number of competitors. Only one variable loads onto Factor 3, and this involves region. Next, the nature of the underlying themes for each factor will be labelled. Factor 1 can be labelled as 'training,' Factor 2 as 'management's competitiveness' and the third factor as 'region.'

Now that the explanatory variables have been reduced to three factors that measure three different underlying dimensions, a regression analysis

TABLE 6 Rotated component matrix

Item	Factors		
	1	2	3
Training supported by SETA	0.930		
Formal training	–0.861		
SETA effectiveness	0.833		
Managers' education		0.732	
Managers' compensation		0.664	
Number of competitors		–0.592	
Labour regulations			
Region			0.964

NOTES KMO and Bartlett's test = 0.677.

TABLE 7 Regression analysis with factor scores

Item	B	Std error	β	VIF
Constant	5.425	0.016		
Factor score 1 'training'	0.106*	0.016	0.221*	1.000
Factor score 2 'management's competitiveness'	0.190*	0.016	0.397*	1.000
Factor score 3 'region'	–0.077*	0.016	–0.160*	1.000

NOTES $R^2 = 23\%$, * $p < 0.005$.

is estimated. Again, the method of ordinary least squares (OLS) estimates a line that best fits the data. This line lies closest to all data points, and has the smallest possible residual values. Low Variance Inflation Factor (VIF) scores and a Durban-Watson score of 1.6 indicate that the model satisfies the Classical Linear Regression Model (CLRM) criteria. Table 7 shows the results obtained from this regression.

Both Factors 1 and 2 have a positive relationship with the dependent variable that is statistically significant. Factor 3 has a negative relationship with the dependent variable, and is also statistically significant. A one unit change in management's competitiveness (Factor 2) will lead to the greatest increase in the dependent variable (output per worker). This regression model has an R^2 of 23 per cent; therefore 23 per cent of the variability of output per worker is explained by the explanatory variables in this model. This model is to some extent inferior to the model in the previous section, which had an R^2 of 48 per cent, and explained 48 per cent of the variability of output per worker. The bottom line is that prin-

cipal component analysis showed that output per worker in manufacturing firms in the survey can be explained by three underlying factors. These are 'training,' 'management's competitiveness' and 'region.' Next, concluding remarks will highlight the findings of this paper.

Conclusion

This paper explored potential human capital constraints in the South African economy. Human capital constraints are aspects of human capital that limit the productivity and effectiveness of the workforce. The first section indicated that an inadequately educated workforce and restrictive labour regulations are the two major human capital constraints facing the South African economy. The consequences of investing in education were shown to be a form of capital, namely human capital. Empirical evidence in the fourth indicated that there is a positive relationship between educational attainment and output per worker and therefore productivity. Managers with higher levels of education achieved higher levels of output per worker from their labour force. The study also found that the existence of training programmes and the South African Sector Education and Training Authority (SETA) support had no significant influence on output levels among firms in the survey. SETA support was also shown to have minimal effect – neither effective nor ineffective influence on firms in the survey. Small and medium-sized firms also experienced very little SETA support compared to large firms.

The influence of labour regulations on manufacturing firms in the survey was shown to be diminutive in the third section. In the Global Competitiveness Report, the World Economic Forum describes South African labour regulations as restrictive. Formal sector employment is over protected. However, this study found no significant evidence that suggests that labour regulations have an influence on the level of output among manufacturing firms in the survey. Other labour market distortions also exist in the South African economy. These include high levels of unemployment, an oversupply of semi-skilled production workers and a concentration of industries and firms that are location biased. Firms situated in the city of Johannesburg were shown to have the highest output per worker figures.

For South Africa to achieve higher levels of growth and output, a new approach to human capital development is needed. The current global market is one that is 'learning led' and the demand for newer, more advanced products and services is very large. Recent initiatives to develop

human capital in South Africa have proven to be unsuccessful. Government initiatives as well as labour unions are more focussed on the redistribution of wealth and improved working conditions than on increased competitiveness, efficiency and productivity. This leads to a decreasing marginal productivity as employment increases.

Results from a Principal Component Analysis (PCA) revealed that the explanatory variables used in the regression analysis measure three underlying dimensions, namely training, management's competitiveness and region. The first two latent variables (underlying dimensions) explain the majority of the total variance. The importance of quality human capital measures, such as the level of education, compensation and training, therefore highlights the importance of quality human capital development in the South African manufacturing sector.

Scope for further research on human capital and its influence on productivity will depend greatly on the availability of improved measures to define the quality aspect of human capital. Countries, firms and even individuals possess different levels of financial and human capital, and it is the mixture of these two forms of capital that brings forth productivity. Policy recommendations include:

- A restructuring of SETA to improve support to manufacturing firms in South Africa. The consequence of discriminatory policies in South Africa's past has led to inequalities in the country's labour market. This paper proposes that SETA investigates a two-fold approach that distinguishes between low-skilled (unemployed), and highly-skilled professional employment. Such an approach would not only be more targeted, but could also deal with the issues of unemployment and skills shortages at the same time. To address the effectiveness of these bodies, authorities should explore the link between sectoral training and productivity. This could be done via the inclusion of targets of a qualitative nature, and not merely quantitative measures such as the number of candidates that complete training and development;
- Additional measures to create a more flexible bargaining process in sectors that are sensitive to changes in labour legislation. This includes a general decentralisation of bargaining in the manufacturing sector; and
- Implementing structures to evaluate and regulate human capital development initiatives that incorporate training, education and business development.

A final aspect that needs attention is the unavailability of reliable data on human capital development, and the absence of measures to assess developments in human capital formation and quality education.

References

Asteriou, D., and S. G. Hall. 2007. *Applied Econometrics: A Modern Approach.* New York: Palgrave.

Barro, R. J. 2001. 'Human Capital and Growth.' *American Economic Review* 91 (2): 12–7.

Barro, R. J., and S. Sala-I-Martin. 1992. 'Convergence.' *Journal of Political Economy* 100 (2): 223–51.

Becker, G. S., K. M. Murphy, and R. Tamura. 1990. 'Human Capital, Fertility, and Economic Growth.' *Journal of Political Economy* 98 (5): S12–S37.

Bhorat, H., and P. Lundall. 2004. 'Employment, Wages and Skills Development: Firm-Specific Effects – Evidence from a Firm Survey in South Africa.' *South African Journal of Economics* 72 (5): 1023–56.

Chandra, V., L. Moorty, J. P. Nganou, B. Rajaratnam, and K. Schaefer. 2001. 'Constraints to Growth and Employment in South Africa: Evidence From the Small, Medium and Micro Enterprise Firm Survey.' World Bank Discussion Paper 15, World Bank, Washington.

Checchi, D. 2006. *The Economics of Education: Human Capital, Family Background and Inequality.* Cambridge: Cambridge University Press.

Colander, D. C., and E. N. Gamber. 2002. *Macroeconomics.* Englewood Cliffs, NJ: Prentice Hall.

Cypher, J. M., and J. L. Dietz. 2009. *The Process of Economic Development.* London: Routledge.

Dessus, S. 2001. 'Human Capital and Growth: The Recovered Role of Education Systems.' Working Paper 2632, The World Bank, Social and Economic Development Group, Washington.

Fedderke, J. W. 2005. 'Technology, Human capital and Growth.' Working Paper 27, University of Cape Town, School of Economics, Cape Town.

———. 2006. 'From Chimera to Prospect: South African Sources of and Constraints on Long Term Growth, 1970–2000.' Policy Paper 1, University of Cape Town, School of Economics, Cape Town.

Fedderke, J., and G. Szalontai. 2005. 'Industry Concentration in South African Manufacturing: Trends and Consequences.' Africa Region Working Paper 96, University of Cape Town, Cape Town.

Field, A. 2005. *Discovering Statistics Using* SPSS. 2nd ed. London: Sage.

Filler, R. K., D. S. Hamermesh, and A. Rees. 1996. *The Economics of Work and Pay.* New York: HaperCollins.

Griliches, Z. 1997. 'Education, Human Capital and Growth: A Personal Perspective.' *Journal of Labour Economics* 15 (1): 330–44.

Kingdon, G., and J. Knight. 2007. 'Unemployment in South Africa 1995–2003: Causes, Problems and Policies.' *Journal of African Economies* 16 (5): 813–48.

Kleynhans, E. P. J. 2006. 'The Role of Human Capital in the Competitive Platform of South African Industries.' *South African Journal of Human Resource Management* 4 (3): 55–62.

Kraak, A. 2003. *Human Resource Development Review: Education, Employment and Skills in South Africa.* Cape Town: HSRC.

Moll, P. 1996. 'Compulsory Centralisation of Collective Bargaining in South Africa.' *American Economic Review* 86 (2): 326–29.

Nattrass, N. 2003. 'Unemployment and AIDS: The Social-Demographic Challenge for South Africa.' CSSR Working Paper 43, University of Cape Town, Centre for Social Science Research, Cape Town.

Naudé, C. 2006. 'Measures of Manufacturing Industry Concentration: Implications for South Africa.' Paper presented at the conference Accelerated and Shared Growth in South Africa: Determinants, Constraints and Opportunities, Muldersdrift, 18–20 October.

Naudé, W. A., and T. Gries. 2004. 'The Economic Geography and Determinants of Manufacturing Exports from South Africa.' Paper presented at the Conference on Growth, Poverty Reduction and Human Development in Africa, Oxford, 21–2. March.

National Treasury (South Africa). 1999. 'Budget 1999: Budget Speech.' http://www.treasury.gov.za

———. 2010. 'Budget 2010: Budget Speech.' http://www.treasury.gov.za

Rogerson, C. M. 2004. 'The Impact of the South African Government's SMME Programs: A Ten-Year Review (1994–2003).' *Development Southern Africa* 21:765–84.

———. 2008. 'Tracking SMME Development in South Africa: Issues of Finance, Training and the Regulatory Environment.' *Urban Forum* 19 (1): 61–81.

Schultz, T. W. 1960. 'Capital Formation by Education.' *Journal of Political Economy* 68 (3): 571–83.

Schwab, K., M. E. Porter, and A. Lopez-Claros. 2006. *The Global Competitiveness Report.* New York: Palgrave.

World Bank. 2006. 'South Africa: Enhancing the Effectiveness of Government in Promoting Micro, Small and Medium Enterprise.' Report for the Department of Trade and Industry, Pretoria.

Corporate Leverage and Financial Decision in the Indian Textile Industry

Ramachandran Azhagaiah
Selvaraj Sathia

In the presence of market imperfections, leverage has the potential to have an important influence on investment decisions. If a firm makes money on its borrowing (has favorable financial leverage), the shareholders realize higher earnings per share (EPS) than would be the case in the absence of debt, as the debt-equity ratio (DER) is a long term risk measure. In the present study 25 textile firms, which are listed in Bombay Stock Exchange are taken as a sample for the study period from 2004 to 2008. The study reveals that the firms i. e. ACM, AFL, ASL, BASML, BCIL, GSM, GDPM and GJML show significant growth rate in financial, operating and combined leverage.

Key Words: capital structure, financial leverage, operating leverage, corporate leverage, financial decision, debt equity ratio
JEL *Classification:* G30, G32, G35

Introduction

Financial Decision (FD) plays a crucial role in the survival of a firm. Business decisions of the firms in general and strategies in particular are molded by the business environment. Every businessman has to face tough competitions, uncertainty and risk prevailing in the trade. External factors like the economic, political/regulatory, social, demographic, technological and natural factors which make up the opportunities for and threats to business, and internal factors like the resources, capabilities and goodwill of the organization, internal power relationships etc., which decide the strength and weakness of the firm. The firm's capital structure (CS), which is the mix of debt and equity is considered to be optimum when the market value of the share is maximized. When the shareholders' return is maximized with minimum risk the market value

Dr Ramachandran Azhagaiah is an Associate Professor in the Kanchi Mamunivar Centre for Post Graduate Studies, Pondicherry Central University, India.

Selvaraj Sathia is a Research Scholar in the Kanchi Mamunivar Centre for Post Graduate Studies, Pondicherry Central University, India.

Managing Global Transitions 10 (1): 87–114

per share will be maximized and the firm's CS would be considered optimum. Once the financial manager is able to determine the best combination of debt and equity, he must generate the appropriate capital through the best available sources. Hence, debt equity ratio (DER) is determined to ascertain soundness of the long-term financial policies of the firm.

CORPORATE LEVERAGE (COL)

In the presence of market imperfections, leverage has the potential to have an important influence on investment decisions. Jensen (1986; 1989) argues that leverage limits managerial discretion over free cash flow and lowers the likelihood that resources are expended for negative net present value investments. In business parlance, *leverage* refers to the relationship between percentage of business changes in fixed cost and in earnings before interest and taxes (EBIT) i. e. *operating profit* (OP). In other words, leverage results from the use of fixed cost assets or funds to magnify returns to firm's owners. It is the employment of an asset or source of finance for which the firm pays fixed cost or fixed return. Leverage may be of three kinds: i. e. *financial leverage* (FL); *operating leverage* (OL); and *combined or composite leverage* (CL).

FL reflects the FDS of the firm. It refers to the use of funds obtained by fixed cost or fixed return securities such as debentures, bonds, preference shares etc. in the hope of increasing the return to equity shareholders. *Favorable or positive leverage* is said to occur when the firm uses funds obtained at fixed cost to earn more than the fixed financing costs paid. *Unfavorable or negative leverage* occurs when the firm does not earn as much as the fixed financing costs.

If a firm is making money on its borrowing (*has favorable* FL), the shareholders are realizing higher earnings per share (EPS) than would be the case in the absence of debt. OL occurs where a firm has fixed cost that must be met regardless of the volume or value of sales. With fixed cost, the percentage change in operating profit affirming a change in sales is greater than that of the percentage change in sales. In business terminology a high degree of OL, other factors held constant, implies that a relatively small change in sales results in a large change in EBIT. The degree of OL depends upon the amount of fixed elements in the cost structure, and it is the function of three factors, i. e. the *fixed cost, the variable contribution margin, and the volume of sales.* OL and FL combine them in a multiplicative form to bring about a more proportionate change in EPS for a given percentage change in activity. This is because the dispersion

and risk of possible EPS are increased. With the presence of fixed operating costs and fixed financing costs, a given change in sales is translated into a larger relative change in EPS through a two step magnification process.

Literature Review

Prior empirical research on leverage shows that leverage can constrain investment (Lang, Ofek, and Stulz 1996; Denis and Denis 1993). Merton (1974) suggested for highly leveraged firms, contingent claims. He predicted that almost all firms' value is in the hands of the debt holders. A small increase in cash reserves goes largely to increase the value of debt (and not equity value) and implies that the probability of bankruptcy decreases. Jensen and Meckling (1976) proposed that managerial ownership reduces their incentives to engage in non-optimal behavior. Firms with higher investment in intangible assets tend to use less debt in their CS to reduce the agency costs associated with risky debt (Myers 1977). For low-growth firms, this means that growth adds value to the firm, which increases borrowing capacity. Operating fixed costs (in effect a capacity constraint) could have an impact on the choice of FL (Huffman 1983). Mandelker and Rhee (1984) found a positive relationship between both degree of financial leverage (DFL), degree of operating leverage (DOL) and systematic risk (SR).

Later, Huffman (1989) replicated the study of Mandelker and Rhee and also found a consistent positive relationship between SR and DFL. Mandelker and Rhee and Huffman both tested to determine whether firms traded off the amount of total leverage which they faced by substituting one type of leverage for the other, and found evidence that firms with low levels of DFL tend to have higher levels of DOL and vice-versa. However, Huffman was, again, unable to re-confirm their findings with confidence. Mandelker and Rhee found no statistically significant relationships between the measures of leverage and the risk measures (only the correlation between DOL and SR was significant).

Information asymmetry induces the pecking order of FDS (Myers, Majluf and Nicholas (1984)). Stulz (1988) argued that when leverage is increased because of the firm's buying out other (passive) shareholders, the percentage of non-insider shares that an acquirer would need to purchase increases. Gordon and Mackie-Mason (1990) found that, after two years from the reform, the 1986 Tax Reform Act (TRA) produced a lower effect on the DER than that predicted by a theoretical model of immediate full

adjustment. Li and Henderson (1991) tested for the impact of both DOL and DFL on total risk. Similar to their result for SR, they found a significant positive relationship between total risk and DOL, but could not confirm a statistically significant relationship in the case of DFL. They also found a positive relationship between DFL and SR using the time-series estimates of degree of leverage measures suggested by O'Brien. However, they could not confirm that the inter-relationship between the two types of leverage had any influence on SR. Choe (1991) tested the proposition that substitution of short-term debt (STD) for long-term debt (LTD) increases the expected returns of common stocks.

Ang (1992) argued that the relationship between size and leverage is rather complex, and enough reasons can be found to justify both lower or higher leverage in (privately held) small firms when compared with larger firms. Indeed, empirical evidence does not provide support for a clear and monotone relationship between size and leverage, although small firms generally show higher leverage ratios and make greater use of short-term financing than the larger firms. Whited (1992) found that firms with high leverage display a higher sensitivity of investment to cash flow. John (1993) presented evidence for firm-level determinants of cash holdings, indicating that firms with higher costs of financial distress and higher cash flow volatility hold significantly more cash, while firms with higher leverage, higher growth rates, a longer cash conversion cycle, and more tangible assets hold less cash. Raad and Wu (1994) found that stockholders of mergers financed with stocks suffer significant losses.

Vogt (1994) found that the relationship between cash flows and investment spending differs significantly between small and large firms. Smaller growth firms conform more to the pecking order behavior. Rajan and Zingales (1995) found that there is a significant relationship between firms' leverage and variables measuring firms' size, asset tangibility, profitability and growth prospects, and that their relationships to leverage are broadly similar in each of the seven countries despite their institutional differences. Lord (1996) inferred that DOL, the ratio of net profits to firm value, and the variability of unit output are all found to be positively correlated with each of the three risk measures. The DFL, while positively related to total and unsystematic risk (UR), does not appear to be related to SR. Honohan (1997) advocated 'speed limits' to restrict the rate of growth of banks' loan portfolios. Kim, Mauer and Sherman (1998) inferred that cash holdings increase with a higher market-to-book

ratio and higher cash flow volatility, revealing that cash holdings decrease with firm size, leverage, the length of the cash conversion cycle, and the probability of financial distress.

Parrino and Weisbach (1999) found that the agency costs of debt can be so high that firms cannot raise funds and therefore forego profitable investment projects. Mahajan (1999) found three possible reasons for the decline in stockholders' wealth: changes in earnings, changes in beta, and changes in variance of earnings after the announcements. Opler et al. (1999) suggested that firms with low debt levels tend to hold more cash because a low leverage ratio makes the firm less subject to market monitoring. Gelb (2000) found that firms with lower levels of managerial ownership tend to provide more extensive disclosures in their annual reports, which suggests that managerial ownership mitigates agency costs and reduces investors' information needs.

Gelb and Siegel (2000) found that firms with high levels of intangible assets are more likely to emphasize dividend increase and stock repurchase (which are generally perceived as signaling favorable investment opportunities), instead of traditional accounting disclosures, as a means of overcoming adverse selection. Chen, Chen and Su (2001) found that the management in Chinese listed firms always manipulates the accounting profit in order to cater to the return on equity (ROE) requirement made by the Chinese Securities Regulatory Commission (CSRC); the ROE is easier to be twisted by earning management. Benito and Whitley (2003) found evidence that the external finance premium postulated by the 'pecking order hypothesis' has a non-linear relation with firms' capital leverage, where changes in leverage only affect the premium at high levels of leverage.

Olafsson (2003) pointed out that even when cash flows received in the future are assumed to be stochastic, resulting in a distribution for the NPV instead of a single number, the resulting framework does not provide a basis for a decision-making tool as no assumptions have been made on attitudes to risk. Iona, Leonida and Ozkan (2004) treated a firm as financially conservative if it has both low leverage and high cash reserves at the same time; they suggested that managerial ownership, board composition, and to some extent, ownership concentration influence the likelihood of firms to adopt a conservative financial policy. Faulkender (2004) reported that the determinants of cash holdings are somewhat different; small firms tend to hold more cash as their leverage increases, possibly because they have limited access to the CM.

Faccio, Lang and Young (2004) provided empirical evidence that in Europe, where the monitoring role of debt is effective due to the established and enforced capital market institutions, entrenched managers decrease leverage; in contrast, in Asia, where the monitoring role of debt is less effective than in Europe, entrenched managers abuse debt. Ferreira and Vilela (2004) reported that cash holdings are positively affected by growth opportunities and cash flows, whereas asset liquidity, leverage, bank debt, and firm size negatively impact cash holdings. Kytonen (2005) and Kim, Mauer and Sherman (2005) found that the funds allocation in the firms, where controlling shareholders have high cash flow rights are better aligned with the investment opportunities and, therefore, more efficient than in the firms where they have low cash flow rights. Francis, Khurana and Pereira (2005) found that firms with a greater external financing need to have higher voluntary disclosure levels. They also document that these firms benefit from higher voluntary disclosure by having lower cost of both debt and equity capital (EC).

Leary and Roberts (2005) found that firms are more likely to increase (decrease) leverage if their leverage is relatively low (high), if their leverage has been decreasing (accumulating), and if they have recently decreased (increased) their leverage through past FDS. Saibal (2005) suggested that the leverage ratio can serve as a useful signpost of asset quality and second, the analysis points to the need to improve the collection of data from the corporate sector.

Ruland and Zhou (2005) revealed a strong positive association between leverage and the values of diversified firms. The values of specialized firms do not increase with leverage. Faulkender and Wang (2006) inferred that the average marginal value of cash across all firms declines with larger cash holdings, and higher leverage. Moon and Tandon (2007) found that the association between equity ownership and leverage is significant for low-growth firms, but not for high-growth firms. Li and Tang (2007) found that low FL actually improves the profitability, stock expansion ability and market value of listed firms; however, as an important capital resource for the existence and development of a firm, FL also has a positive influence on the firm when increasing the debt to a certain degree, revealing that large scale firms perform better on their profitability, the stock expansion ability, operational efficiency, financial elasticity and safety, while their market value is lower. Drobetz and Gruninger (2007) found that the market to book ratio is a proxy for both growth opportunities and/or the importance of adverse selection costs, leading to

competing hypotheses in a pecking order framework. Jugurnath, Stewart and Brooks (2008) provided evidence that DER was positive and significant in the US only; they also provided evidence that FL influences CCI in the US.

The overall effect of leverage recapitalizations is to improve firm's value, as supported by the prior literature. However, the evidence also points to a straightforward indirect cost of FL that has received relatively little attention in the literature. High leverage generates interest payments that may be high relative to current levels of cash flow. When managers face substantial personal costs of financial distress, this can create incentives to emphasize investments that maximize the cash flow of the firm, possibly at the expense of undertaking investments with the highest net present value. This effect of high leverage is likely to influence the divisional allocation of investment within a firm. The estimates suggest that the increase in firm's value around the recapitalization would be larger in the absence of such changes in divisional allocation. In this regard, the study adds to a wide literature emphasizing the indirect costs of debt financing.

Objectives and Hypotheses Development

STATEMENT OF THE PROBLEMS

FD making is primarily concerned with developing the skills needed to make the FDS required in a rapidly changing corporate business environment. If the overall level of business activity is rising, most firms will need more money to expand their operations. The need for additional long-term funds will bring a firm to the money markets for either debt or equity funds. On the other hand, a decline in business activity may allow a firm to cut back its operations and use its cash to retire debt or equity securities.

Therefore, the present study mainly analyses how far the level of corporate leverage (COL) affects the FD making in the Textile industry in India. The debt equity ratio (DER) is employed, which is the most common indicator of COL. In effect, this ratio signifies how much business is financed through debt vis-à-vis equity. A very high leverage ratio implies greater risk to present or future investors.

SIGNIFICANCE AND SCOPE OF THE STUDY

Though many research studies have been undertaken in the field of COL and FDS, only very few studies have been undertaken to analyze the im-

pact of COL on FD. Therefore, the present study attempts to analyze the impact of COL on FD in the textile industry in India. The scope of the study is limited to the area of consumer textiles and industrial textiles only. The study comprises an attempt to provide an empirical support to the conjectured impact of leverage on FD.

RESEARCH QUESTIONS

The present study is proposed to seek answers to the following stated questions:

- What is the significance of various leverages and FDs?
- Is there a degree of relation between FL and FDs?
- How far are the leverage and FDs inter-related?
- How do the profitability and liquidity ratio influence the FD?

OBJECTIVES AND HYPOTHESES OF THE STUDY

The following are the objectives and hypotheses of the study:

- To analyze the impact of sales on EBIT on selected textile firms in India.
- To study the variance ratios of investment and borrowings as well as net worth and borrowings of selected textile firms in India.
- To study the various ratios of net worth and corporate leverage as well as net worth and financial leverage.
- To associate the FL with the FD with respect to the progress of the firm.

H_0^1 *There is no significant relationship between the sales and* EBIT *as well as the derived correlation coefficient from sales and* EBIT *with effect to leverage.*

H_0^2 *There is no significant relationship between the investment and borrowings with respect to leverages as well as* FDs.

H_0^3 *There is no significant relationship between the net worth and borrowings with respect to leverages as well as* FDs.

H_0^4 *There is no significant relationship between the net worth and combined leverage with respect to* FDs.

H_0^5 *There is no significant relationship between the net worth and* FL *with respect to* FDs.

Methodology

SOURCES OF DATA

The study used only secondary data, which are collected from the CMIE prowess (package). The data collected from this source have been compiled and used with due care as per the requirements of the study.

SAMPLING DESIGN

In the present study, 25 textile firms are chosen randomly from the listed firms in Bombay Stock Exchange based on the adequacy of data for the study period i. e. from 2004–2008. The firms chosen are the mixture of *small, medium* and *large* in sizes based on their capital.

TOOLS FOR ANALYSIS OF DATA

To analyze the data, statistical tools that have been used are correlation and regression methods to ascertain the best fitted model for making FDS.

Regression Analysis

1. The regression equation of X on Y is
$$X - \overline{X} = r\frac{\sigma_x}{\sigma_y}(Y - \overline{Y}),$$
$$r\frac{\sigma_x}{\sigma_y} = \frac{\sum xy}{\sqrt{\sum y^2}},$$
where $\overline{X}$ is the mean of X series, $\overline{Y}$ is the mean of Y series, and $r(\sigma_x/\sigma_y)$ is known as the regression co-efficient of X on Y.
2. Regression Equation of Y on X:
$$Y - \overline{Y} = r\frac{\sigma_y}{\sigma_x}(X - \overline{X}),$$
$$r\frac{\sigma_y}{\sigma_x} = \frac{\sum xy}{\sqrt{\sum x^2}},$$
where $r(\sigma_y/\sigma_x)$ is known as the regression co-efficient of Y on X.

Considered the COL as independent variable; FD as dependent variable, keeping other control variables constant.

PERIOD OF THE STUDY AND LIMITATIONS

Period of the Study

The data used for the analysis relate to the selected textile firms for the period of 5 years on a yearly basis ranging from 2004 to 2008.

Limitations

- The study is limited to 5 years' data only; therefore a detailed trend covering a lengthy period is not possible.
- The study is based on secondary data, which are collected from the CMIE Prowess (package), hence the quality of the study depends purely upon the accuracy, reliability and quality of the secondary data.
- The study is confined to only 25 firms of the textile industry, which are listed in Bombay Stock Exchange (BSE).

SIGNIFICANCE OF THE TEXTILE INDUSTRY IN INDIA

The Indian textile industry is estimated to be around USD 52 billion and is likely to reach USD 115 billion by 2012. The domestic market is likely to increase from USD 34.6 billion to USD 60 billion by 2012. It is expected that India's share of exports to the world would also increase from the current four per cent to around seven per cent during this period. India has overtaken the US to become the world's 2nd largest cotton producing country, after China, as per a study by International Service for the Acquisition of Agra-biotech Application. India is the largest exporter of yarn in the international market and has a share of 25 per cent in world cotton yarn exports and accounts for 12 per cent of the world's production of textile fibers and yarn. The country (India) has the highest loom capacity, including handlooms, with a share of 61 per cent in world loom age. India is the largest producer of jute in the world. It is the second largest producer of silk and the only country to produce all four varieties of silk – Mulberry, Tsar, Ere and Muga. The primary contribution of the Textile Industry is export earnings for the country; the textile industry occupies 16% of the country's export earning. Industrial output sums up to 14% of total industrial production and contributes to approximately 30% of total export products. In an effort to increase India's share in the world textile market, the Government of India has introduced a number of progressive steps.

The Indian textile industry is striving to realize its full potential and face the emerging challenges of globalization and liberalization. Thus leveraging firms lead to borrowing, which leads to debt. The DER is a long run risk measure. Debt to equity compares debt to the owner's investment in the business. An increase in the debt-equity ratio increases the firm's FL, because this makes additional debt financing available.

TABLE 1 FL of Textile Firms for the period 2004–2008

No.	Name of the Firm	2004	2005	2006	2007	2008
1.	Aditya Mills Ltd.	1.11	1	1	1	1
2.	Alka India Ltd.	1.03	6.78	1	1	1
3.	Ambika Cotton Mills Ltd.	1.39	1.30	1.31	1.89	1.58
4.	Anjani Fabrics Ltd.	1.46	1.39	1.20	1.70	1.53
5.	Arasan Syntex Ltd.	2.86	3.22	5.04	1.91	2.14
6.	Arunoday Mills Ltd.	0.33	0.39	0.26	1	0.98
7.	Asia Pack Ltd.	1	1	1	1	1.02
8.	Bannari Amman Spinning Mills Ltd.	1.08	1.04	1.10	1.28	1.57
9.	Birla Cotsyn India Ltd.	2	3.67	1.34	1.08	1.18
10.	Blue Blends (India) Ltd.	–0.45	1.04	1.01	2.47	0.58
11.	Bombay Dyeing & Mfg. Co. Ltd.	1.34	1.41	0.86	1.64	0.49
12.	Coimbatore Pioneer Mills Ltd.	0.78	0.48	0.11	1.01	0.69
13.	Damodar Threads Ltd.	1.32	1.37	1.23	1.18	2.10
14.	East India Commercial Co. Ltd.	2.67	1.46	1.19	1.17	1.21
15.	Futura Polyesters Ltd.	11.87	3.62	0.98	2.10	2.21
16.	Garden Silk Mills Ltd.	1.39	3.85	2.55	2.10	1.93
17.	Gemini Dyeing & Printing Mills Ltd.	5.71	1.91	1.48	1.51	1.94
18.	Gloster Jute Mills Ltd.	1.31	1.37	1.49	1.65	1.18
19.	Indo Rama Synthetics (India) Ltd	1.18	1.33	1.36	1.97	12.94
20.	Jindal Texofab Ltd.	1.39	1.49	0.54	3.37	5.70
21.	Modern Threads (India) Ltd.	0.37	0.86	0.77	1.13	–0.79
22.	Orient Craft Ltd.	1.14	1.41	1.41	1.49	2.12
23.	Pondicherry Spinners Ltd.	0.28	1	0.93	1	1
24.	Provogue (India) Ltd.	1.23	1.19	1.18	1.19	1.42
25.	Veejay Lakshmi Textiles Ltd.	1.29	1.14	1.14	1.41	0.63

Firms with high debt ratios pay lower dividends, because they have already committed their cash flows to make debt payments. The present study is intended to analyze how far the leverage has impact on the FDS, and to study the relationship between the firm's FL and FD.

Industry Analysis and Discussion

The principal focus of the study is to analyze the effect of leverages and ratios which help the (selected 25 textile firms) textile industry in India to

take significant decisions in risky situations. The secondary data relating to various facets of growth were analyzed with the use of appropriate statistical tools. The results of the analysis are presented and interpreted in the following paragraphs:

The calculated value of F is compared with the table values for υ_1 and υ_1 at 5% and 1% level of significances. If the calculated values of F are greater than the table values then the F ratio is significant, and H_0 is rejected. On the other hand, if the calculated values of F are lower than the table values the null hypothesis is accepted.

FINANCIAL LEVERAGE OF TEXTILE FIRMS

The FL is employed in the hope of increasing the return to common shareholders and is used to measure the solvency of the firm and the ability of a firm in order to test whether the firm can regularly pay interest against long-term borrowings. Table 1 shows the FL of 25 selected firms in India for the study period from 2004 to 2008. The firms, viz., Blue Blends ltd in 2004, Bombay Dyeing Ltd., in 2006, 2007, 2008, Coimbatore Pioneer Mills Ltd in 2006, Futura Polyesters Ltd in 2004 and 2006, Modern Threads India Ltd in 2006 and 2008 all show negative FL. This indicates that they might have faced loss; however, these firms have shown a positive FL for the remaining years of study. This reveals that these firms have earned more than the financial commitment such as interest on borrowings they had in those years. The FL is exactly one for Aditya Mills Ltd from 2005 to 2008, Alka India Ltd from 2006 to 2008, Arunoday Mills Ltd in 2007, Asia Pack Ltd in 2004 to 2007, Pondicherry Spinners Ltd in 2005, 2007 and 2008, which shows that these firms have shown a nil liability in respect of interest.

Firms i. e. Alka India in 2005 (6.78), Arasan in 2004 (2.86), 2005 (3.22), 2006 (5.04), 2008 (2.14), Birla in 2004 (2), 2005 (3.67), Blue in 2007 (2.47), Damodar in 2008 (2.10), East India in 2004 (2.67), Futura in 2005 (3.62), 2007(2.1), 2008 (2.21), Garden 2005 (3.85), 2006 (2.55), 2007 (2.10), Gemini in 2004 (5.71), Indo Rama in 2008 (12.94), Jindal in 2007 (3.37), 2008 (5.7), and Orient 2008 (2.12) show a positive FL value of more than 2, which proves that the firms gained more profit in these years.

OPERATING LEVERAGE OF TEXTILE FIRMS

Firms i. e. Aditya (2007), Alka (2005, 2006, and 2008), Arunoday (from 2004 to 2007), Blue (2008), Bombay (2008), Coimbatore Pioneer Mills (2005 and 2007), Jindal Texafab (2006), Modern (2004 and 2005), Pondicherry Spinners (from 2004 to 2007), Veejay (2008) show negative OL

TABLE 2 Operating Leverage of Textile firms for the period 2004–2008

No.	Name of the Firm	2004	2005	2006	2007	2008
1.	Aditya Mills Ltd.	0.33	2.06	21.3	10.15	0.54
2.	Alka India Ltd.	1.38	–1.13	–0.02	43.68	–1.88
3.	Ambika Cotton Mills Ltd.	1.72	1.64	1.43	2.39	1.45
4.	Anjani Fabrics Ltd.	6.43	4.68	2.41	4.52	1.46
5.	Arasan Syntex Ltd.	8.13	4.47	3.44	2.93	2.29
6.	Arunoday Mills Ltd.	–1.12	–1.96	–1.34	–0.12	0.43
7.	Asia Pack Ltd.	0.10	3.18	1.27	0.96	0.32
8.	Bannari Amman Spinning Mills Ltd.	2.23	0.69	1.26	1.27	1.35
9.	Birla Cotsyn India Ltd.	2.07	3.45	1.22	1.44	1.99
10.	Blue Blends (India) Ltd.	2.55	2.95	0.38	4.59	–3.49
11.	Bombay Dyeing & Mfg. Co. Ltd.	5.71	3.69	3.84	3.18	–2.22
12.	Coimbatore Pioneer Mills Ltd.	0.44	–0.29	17.25	–0.02	0.002
13.	Damodar Threads Ltd.	2.06	1.89	3.31	3.24	1.82
14.	East India Commercial Co. Ltd.	2.51	2.07	1.55	2.16	1.77
15.	Futura Polyesters Ltd.	4.21	4.65	10.97	4.17	2.51
16.	Garden Silk Mills Ltd.	4.58	6.62	3.56	2.92	2.72
17.	Gemini Dyeing & Printing Mills Ltd.	4.23	3.50	2.11	2.34	2.06
18.	Gloster Jute Mills Ltd.	3.69	2.36	1.89	2.99	1.59
19.	Indo Rama Synthetics (India) Ltd	2.29	4.66	6.57	2.31	3.88
20.	Jindal Texofab Ltd.	18.44	14.27	–14.68	11.39	6.21
21.	Modern Threads (India) Ltd.	–0.42	–0.05	1.37	0.09	1.59
22.	Orient Craft Ltd.	7.68	7.59	5.39	3.25	4.15
23.	Pondicherry Spinners Ltd.	–4.5	–0.5	–1.46	–1.67	0.15
24.	Provogue (India) Ltd.	1.52	3.33	2.41	2.68	2.26
25.	Veejay Lakshmi Textiles Ltd.	1.19	4.43	2.19	3.04	–2.21

due to operating loss during these years (see table 2). The OL value of <1 proves that the OP is less than their liability. Among the selected firms Ambika, Anjani, Arasan, Birla, Damodar, East India, Futura, Garden silk, Gemini, Gloster, Indo Rama, Orient, Provogue have shown a positive OL securing value >1 throughout the study period.

COMPOSITE LEVERAGE OF TEXTILE FIRMS

Firms i. e. Aditya (2007), Alka (2005, 2006, and 2008), Arunoday (2004–2008), Blue (2004 and 2008), Bombay (2006–2008), Coimbatore (2005–

2008), Futura (2004 and 2006), Jindal (2006), Modern (2004–2006 and 2008), Pondicherry Spinners (2004–2007), and Veejay (2008) show negative CL values (see table 3). From the selected firms, Ambika, Anjani, Arasan, Bannari, Birla, Damodar, East India, Garden Silk, Gemini, Gloster, Indo Rama, Orient, Provogue show a positive CL with values >1. The highest values of CL of firms viz Arasan 2004 (23.38), Garden in 2005 (25.51), Gemini in 2004 (24.13), Indo Rama in 2008 (50.28), Jindal in 2004 (25.65), 2005 (21.26), 2007 (38.37) and 2008 (35.41) show a significant growth in sales, thereby profit.

TRENDS IN FL, OL, AND CL OF TEXTILE FIRMS IN INDIA

Firms i. e. Aditya from 2004–2008, Alka in 2005, 2006, 2008, Arunoday 2004–2008, Blue 2004–2008, Bombay 2006–2008, Coimbatore 2004–2008, Indo Rama 2008, Modern 2004–2008, Pondicherry Spinners 2004–2008, Veejay in 2008, Asia 2004–2005, Futura 2004–2006, Gemini in 2004 and Jindal in 2004, 2006, and 2007 all show negative values, thus proving that the firms incurred loss during those years (see table 4).

Firms i. e. Ambika, Anjani, Arasan, Asia, Bannari, Birla, etc show positive profitability ratios, which proves that there was a significant growth in the profit throughout the study period. Out of these firms, Ambika, Anjani, Arasan, Asia, etc show the highest values, which proves that these firms have gained huge profit, and thus the ratios (EBIT) over the total net income of profit and expenses, profit after tax over total net income shows growth in their calculated values. The return on investment (ROI) is the key indicator of profitability for a firm. It matches OP with the assets available to earn a return. Firms that are efficiently using their assets will have a relatively high return.

Firms, i. e. Ambika, Arasan, Birla, Blue, Coimbatore, Durairaj, Futura, Gemini, etc show an increasing trend in their values, which help the firms to meet their current obligations (see table 4, which shows the liquidity ratios, which help to examine the adequacy of funds, the solvency of the firm, and the firm's ability to pay its obligations). The higher the current ratio, the larger is the amount available per rupee of current liability; the more the firm's ability to meet current obligations, the greater is the safety of funds for short-term creditors. In case of CS, the lower the DER, the higher is the degree of protection enjoyed by the creditors.

The general thumb rule for this ratio is 2:1. The DERs of the firms Aditya (0.23), Alka (1.08), Ambika (2.51), Anjani (1.56), Arasan (1.63), Asia (0.17), Bannari (2.65), Birla (1.34), Bombay (10.22), Damodar (4.83),

TABLE 3 Combined Leverage of Textile Firms for the period 2004–2008

No.	Name of the Firm	2004	2005	2006	2007	2008
1.	Aditya Mills Ltd.	0.37	2.06	21.30	10.15	0.54
2.	Alka India Ltd.	1.43	–7.67	–0.02	43.68	–1.89
3.	Ambika Cotton Mills Ltd.	2.38	2.13	1.88	4.51	2.29
4.	Anjani Fabrics Ltd.	9.36	6.52	2.91	7.69	2.24
5.	Arasan Syntex Ltd.	23.28	14.43	17.33	5.62	4.90
6.	Arunoday Mills Ltd.	–0.37	–0.77	–0.35	–0.12	–0.42
7.	Asia Pack Ltd.	0.10	3.18	1.27	0.96	0.32
8.	Bannari Amman Spinning Mills Ltd.	2.41	0.71	1.39	1.62	2.12
9.	Birla Cotsyn India Ltd.	4.14	12.67	1.63	1.55	2.36
10.	Blue Blends (India) Ltd.	–1.15	3.08	0.39	11.36	–2.04
11.	Bombay Dyeing & Mfg. Co. Ltd.	7.67	5.21	–3.29	–5.22	–1.10
12.	Coimbatore Pioneer Mills Ltd.	0.34	–0.14	–1.97	–0.01	–0.49
13.	Damodar Threads Ltd.	2.73	2.61	4.08	3.81	3.81
14.	East India Commercial Co. Ltd.	6.71	3.01	1.85	2.54	2.14
15.	Futura Polyesters Ltd.	–50.02	16.83	10.78	8.77	5.55
16.	Garden Silk Mills Ltd.	6.35	25.51	9.08	6.15	5.25
17.	Gemini Dyeing & Printing Mills Ltd.	24.13	6.69	3.13	3.53	3.99
18.	Gloster Jute Mills Ltd.	4.85	3.24	2.84	4.94	1.88
19.	Indo Rama Synthetics (India) Ltd	2.71	6.19	8.97	4.55	50.28
20.	Jindal Texofab Ltd.	25.65	21.26	–7.98	38.37	35.41
21.	Modern Threads (India) Ltd.	–0.15	–0.04	–1.05	0.09	–1.26
22.	Orient Craft Ltd.	8.76	10.71	7.62	4.85	8.81
23.	Pondicherry Spinners Ltd.	–1.28	–0.5	–1.36	–1.67	0.15
24.	Provogue (India) Ltd.	1.86	3.98	2.83	3.20	3.22
25.	Veejay Lakshmi Textiles Ltd.	1.55	5.06	2.51	4.28	–1.39

Durairaj (1.44), East (0.84), Futura (1.16), Gemini (0.43), Gloster (0.70), Indo (2.07), Jindal (3.22), Orient (1.78), Pondicherry Spinners (0.01), Provogue (0.47) and Veejay (1.28) for 2008 are most impressive, except for firms viz Bannari, Bombay, Damodar, Jindal for which the values are less than 2, and firms viz Arunoday, Coimbatore and Blue which show 0 value, thus there is a higher degree of protection for those firms which show less DER. The high interest coverage ratio means the firm can easily meet its interest burden even if the EBIT suffer a considerable decline. A

TABLE 4 Trends in FL, OL, and CL of Textile Firms in India

(1)	(2)	(3)	(4)
AML	0.89	0.15	0.15
AIL	0.18	0.79	0.61
ACML	4.57*	0.52	1.08
AFL	5.15	1.69	2.06
ASL	0.05	0.79	2.14
ARML	1.21	0.91	0.14
APL	2.24	0.39	0.38
BASML	1.73	0.41	0.88
BCIL	1.06	2.09	1.51
BBIL	1.02	0.73	0.80
BDMCL	1.79	0.25	1.59
CPML	0.48	0.88	0.28
DTL	0.41	1.73	2.64
EICCL	1.23	2.78	0.27
FPL	0.94	0.45	0.92
GSML	2.34	0.73	0.36
GDPML	1.28	1.71	1.16
GJML	0.37	0.37	0.53
IRSIL	1.06	2.06	0.62
JTFL	2.11	2.06	0.16
MTIL	0.53	1.07	1.07
OCL	0.62	0.25	0.25
PSL	3.92*	1.81	2.63
PIL	1.34	3.12	0.55
VLTL	0.15	0.48	0.75

Column headings are as follows: (1) firm, (2) t-value for FL, (3) t-value for OL, 84) t-value for CL. * Significant at 1% level. Table value of t for $\upsilon = 5-1 = 4$ at 5% level is 2.776 and at 1% level is 4.604.

TABLE 5 Regression and Correlation Coefficient of Sales and EBIT of Selected Textile Firms in India

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
AML	$X = 0.29Y + 2.07$	$Y = 0.19X - 1.28$	2.39	1.11	0.24	5	3	0.44
AIL	$X = -2.53Y + 156.07$	$Y = -4.73X + 755.50$	160.06	1.5	0.11	5	3	0.19
ACML	$X = 3.49Y + 37.47$	$Y = 0.15X + 5.5$	118.89	23.33	0.72	5	3	2.59
AFL	$X = 12.23Y + 42.91$	$Y = 0.03X + 0.73$	81.92	3.19	0.59	5	3	1.57
ASL	$X = 1.49Y - 3.65$	$Y = 0.53X - 9.95$	23.40	2.45	0.89	5	3	7.33
ARML	$X = 0.94Y + 34.79$	$Y = 0.05X - 8.93$	41.25	6.87	0.21	5	3	0.38
APL	$X = 0.86Y + 1.17$	$Y = 1.14X - 1.27$	3.96	3.24	0.99	5	3	85.64
BASML	$X = 0.08Y + 104.56$	$Y = 3.28X - 327.36$	106.25	21.14	0.51	5	3	1.19
BCIL	$X = 0.05Y + 29.72$	$Y = 16.72X - 496.67$	29.82	1.92	0.96	5	3	20.76
BBIL	$X = 14.42Y - 240.16$	$Y = 2.82X - 350.45$	133.46	25.91	0.88	5	3	6.62
BDMCL	$X = 0.06Y + 950.22$	$Y = 6.33X - 5974.45$	954.13	65.19	0.62	5	3	1.73
CPML	$X = -1.89Y + 17.86$	$Y = -0.02X + 8.4$	2.06	8.36	0.21	5	3	0.38
DTL	$X = 15.07Y + 14.63$	$Y = 0.06X - 0.46$	80.79	4.39	0.25	5	3	0.46
EICCL	$X = 8.03Y + 53.68$	$Y = 0.11X - 4.73$	134.62	10.08	0.92	5	3	10.61
FPL	$X = -0.31Y + 496.81$	$Y = 0.02 + 37.32$	505.25	27.21	0.08	5	3	0.14
GSML	$X = 12.85Y - 98.35$	$Y = 0.07X + 1.39$	1156	82.33	0.96	5	3	20.76
GDPML	$X = 3.36Y + 18.77$	$Y = 0.23X - 3.82$	26.20	2.21	0.88	5	3	6.62
GJML	$X = 2.23Y + 108.46$	$Y = 0.28X - 26.16$	134.79	11.78	0.79	5	3	3.69
IRSIL	$X = -1.45Y + 2464.67$	$Y = 0.14X - 171.52$	2255	144.2	0.45	5	3	0.99
JTFL	$X = 8.48Y + 26.42$	$Y = 0.02X - 0.21$	29.98	0.42	0.42	5	3	0.89
MTIL	$X = 0.01Y + 82.25$	$Y = 14.92X - 1219.63$	82.36	9.14	0.43	5	3	0.91
OCL	$X = 3.89Y + 514.28$	$Y = 0.19X - 84.16$	689.51	44.99	0.85	5	3	5.25
PSL	$X = 8.57 + 2.25$	$Y = 0.04X - 0.14$	1.48	0.09	0.55	5	3	1.38
PIL	$X = 7.29Y + 19.13$	$Y = 0.25X - 21.59$	174.78	21.36	1.34	5	3	2.93
VLTL	$X = 1.41Y + 32.03$	$Y = 0.4X - 12.44$	33.75	1.22	0.75	5	3	2.95

Column headings are as follows: (1) firm, (2) regression equation X on Y, (3) regression equation Y on X, (4) mean of sales, (5) mean of EBIT, (6) r, (7) N, (8) df, (9) t-value. able value of t for $\upsilon = 5 - 2 = 3$ at 5% level of significance is 3.182 and at 1% level of significance is 0.841.

low interest coverage ratio may result in financial embarrassment when EBIT declines. Firms i. e. Aditya, Alka, Arunoday, Asia, Blue, Bombay, Coimbatore, etc show a negative or less value, and firms viz Ambika, Anjani, Arasan, Bannari, Birla, Damodar, Durairaj, etc show a higher value. The debtor's ratio is to measure the liquidity of the receivables or to find out the period over which receivables remain uncollected. The debtor's turnover ratios determine the liquidity of the firms. The lesser the period, the more is the liquidity; and the greater the period, the less is the liquidity.

Firms i. e. Ambika, Arasan, Bannari, East, Gloster, Indo and Pondicherry Spinners show a lesser period of collections while the other firms show higher period of collection. In case creditor's payable ratio is longer, the period of outstanding payable is lesser. Firms, viz Bannari, Damodar, and East show a lesser period of payable, while the other firms show a longer period of payables. The calculated *t*-values for firms, viz ACML (4.57) AFL (5.15), and PSL (3.92) are higher than the table value at 5% level; and lower than the table value at 1% level of significance (see table 4). For all the other firms, the *t* values are lower than the table values at 5% level of significance.

H_0^1 *There is no significant relationship between the Sales and* EBIT *and the derived correlation coefficient from Sales and* EBIT *with respect to leverage.*

REGRESSION AND CORRELATION COEFFICIENTS OF SALES AND EBIT

As the *t*-values of most of the firms are lower than the table values, H_0^1 is accepted, therefore it is proved that there is no significant relationship between the Sales and EBIT and the derived correlation coefficient from Sales and EBIT with respect to leverage. However, *F*-values are higher than the table values at 5% and 1% level of significances (see table 5) for firms i. e. BASML (14951.17), BCIL (45.96), BDMCL (55.13), EICCL (64.47), GSML (20.24), GJML (48.64), OCL (59.59), and VLTL (813), and for a few firms, i. e. BBIL, CPML, DTL, JTFL, MTIL, and PSL it shows nil value.

VARIANCE RATIO TESTS OF INVESTMENT AND BORROWINGS AS WELL AS NET WORTH AND BORROWINGS

H_0^2 *There is no significant relationship between the investment and borrowings with respect to leverages as well as* FDS.

TABLE 6 Variance Ratio Tests of Investment and Borrowings as well as Net Worth and Borrowings of Selected Textile firms in India

(1)	(2)	(3)	(4)	(5)	(6)	(7)
AML	0.04	0.59	10	3.09	0.59	0
AIL	19.20	2.26	2.32	60.00	2.26	18.43
ACML	177.34	159.37	1.06	84.88	159.37	11.18
AFL	13.87	13.88	1.04	11.53	13.88	6.89
ASL	20.04	19.29	1.00	9.56	19.29	1.03
ARML	33.12	81.91	3.51	55.39	81.91	1.90
APL	2.08	3.86	5.43	6.97	3.86	2.65
BASML	3.60	163.59	14951.17	110.73	163.59	5.99
BCIL	3.71	20.91	45.96	32.64	20.91	1.36
BBIL	10.74	142.74	0	110.12	142.74	1.04
BDMCL	151.97	750.62	55.13	398.28	750.62	114.54
CPML	0.02	38.93	0	38.20	38.93	1.30
DTL	0.02	34.85	0	11.64	34.85	48.26
EICCL	0.65	31.06	64.47	29.13	31.06	6.19
FPL	25.14	146.09	11.09	160.44	146.09	296.87
GSML	87.44	609.18	20.24	349.04	609.18	14.68
GDPML	3.04	8	1.37	19.95	8.00	4.04
GJML	0.84	30.87	48.64	30.44	30.87	2.09
IRSIL	80.57	792.6	6.98	662.79	792.6	165.04
JTFL	0	9.29	0	3.18	9.29	29.43
MTIL	0.01	272.35	0	374.63	272.35	10.78
OCL	24.54	301.35	59.59	185.95	301.35	10.08
PSL	0	0.28	0	0.89	0.28	2.67
PIL	58.51	63.86	1.98	146.79	63.86	6.87
VLTL	0.15	17.22	813	20.76	17.22	1.76

NOTES Column headings are as follows: (1) firm, (2) investment mean (X), (3) borrowing mean (Y), (4) F-value, (5) net worth mean (X), (6) borrowing mean (Y), (7) F-value. Table value of F for $\upsilon = 5 - 1 = 4$ at 5% level of significance is 6.39 and at 1% level of significance is 15.98.

H_0^2 is rejected as per the calculated F value, and it is concluded that there is a significant relationship between the investment and borrowings with respect to leverages as well as FDS. Observation of table 6 indicates that the F values of AIL (18.43), BDMCL (114.54), DTL (48.26), FPL

(296.87), IRSIL (165.04), JTFL (29.43) are higher than the table value at 5% and 1% levels of significance, and for all other firms the values are lower than the table values, hence H_0^2 is accepted.

VARIANCE RATIO TESTS OF NET WORTH AND CL AS WELL AS NET WORTH AND FL

H_0^3 *There is no significant relationship between the net worth and borrowings with respect to leverages as well as* FDS.

H_0^3 is rejected based on the computed *F* value, since it is concluded that there is a significant relationship between the net worth and borrowings with respect to leverages as well as FDS.

Observation of the results indicates (see table 7) that the calculated *F* values of AIL (8.97), AFL (1.09), FPL (5.76), GSML (10.64), IRSIL (1.25), VLTL (7.93) are lower than the table values at 5% and 1% levels of significance, and the *F* values for the other firms are higher than the table values.

H_0^4 *There is no significant relationship between the net worth and combined leverage with respect to* FDS.

H_0^4 is rejected with the support of calculated *F* value, hence it is concluded that there is a significant relationship between the net worth and combined leverage with respect to FDS. Further, table 7 also reveals that only few firms' *F* values are lower than the table values at 5% and 1% levels of significances [AIL (12.64), ASL (2.32), GDPML (1.64), IRSIL (12.27), and PSL (1.6)], and for all the other firms the *F* values are higher than the table values.

H_0^5 *There is no significant relationship between the net worth and* FL *with respect to* FDS.

H_0^5 is not proved based on calculated *F* value, hence H_0^5 is rejected and thus it is found that there is a significant relationship between the net worth and FL with respect to FDS.

Summary of Results, Concluding Remarks & Suggestions and Scope for Further Studies

SUMMARY OF RESULTS

There is no major change in the FL of firms viz AMI, APL, BASML, GJML, etc. however, there is a significant growth in the FL of ASL, ARML, DTL, GSML, etc. for the study period. Firms i. e., BBIL, BDMCL, CPML, FPL,

TABLE 7 Variance Ratio Tests of Net worth and CL as well as Net worth and FL of Selected Textile firms in India

(1)	(2)	(3)	(4)	(5)	(6)	(7)
AML	0.95	130.38	137.24	0.95	0.003	316.67
AIL	47.92	429.98	8.97	47.92	3.79	12.64
ACML	617.83	1.13	546.75	617.83	0.06	10297.17
AFL	8.61	9.44	1.09	8.61	0.04	215.25
ASL	3.57	61.62	17.26	3.57	1.54	2.32
ARML	497.81	0.89	559.34	497.81	0.14	3555.79
APL	130.77	1.49	87.77	130.77	0	0
BASML	4513.76	0.44	10258.55	4513.76	0.05	90275.2
BCIL	838.31	22.09	37.95	838.31	1.16	722.69
BBIL	4179.72	29.27	142.79	4179.72	1.10	3799.29
BDMCL	1944.09	30.78	63.16	1944.09	1.59	1222.69
CPML	556.33	0.80	695.41	556.33	0.18	3090.72
DTL	33.05	0.47	70.32	33.05	0.14	236.07
EICCL	75.94	3.93	19.32	75.94	0.42	180.81
FPL	4082.02	708.34	5.76	4082.02	39.86	102.41
GSML	774.17	72.75	10.64	774.17	0.86	900.19
GDPML	1.98	1120.78	566.05	1.98	3.25	1.64
GJML	77.12	1.75	44.07	77.12	0.03	2570.69
IRSIL	324.44	404.46	1.25	324.44	26.45	12.27
JTFL	0.14	168.02	1200.14	0.14	4.27	30.50
MTIL	10891.82	0.81	13446.69	10891.82	0.81	13446.07
OCL	1677.79	3.99	420.49	1677.79	0.13	12906.08
PSL	0.16	3.18	19.88	0.16	0.10	1.60
PIL	17710.69	0.59	30018.12	17710.69	0.01	17771.07
VLTL	50.89	6.42	7.93	50.89	0.09	565.44

NOTES Column headings are as follows: (1) firm, (2) net worth variance, (3) CL variance, (4) *F*-value, (5) net worth variance, (6) FL variance, (7) *F*-value. Table value of *F* for $\upsilon = 5 - 1 = 4$ at 5% level of significance is 6.39 and at 1% level of significance is 15.98.

MTIL show a negative leverage for few years of the study period, while firms viz BCIL, VLTL show a decreasing trend in the FL, and the other firms show a triggering trend. Among the selected 25 textile firms there is an increase in the position of OL for two firms, i. e. IRSIL, PIL, while there is a decrease in the position of OL for 10 firms i. e. AMI, AIL, ARML,

BBIL, BDMCL, CPML, etc. during the study period, and the other firms show a triggering trend.

The CL of 11 firms viz., AMI, AIL, ARML, BBIL, BDMCL, CPML, FPL, JTFL, MTIL, PSL and VLTL show a negative trend, while a significant growth rate is found for five firms i. e., IRSIL, OCL, PIL, BASML and DTL in terms of CL during the study period. However, there is a decreasing trend in the CL of firms viz., AFL, APL, GJML, VLTL; the other firms show a triggering trend during the study period.

There is no significant difference between the financial variables of sales and EBIT; the derived correlation coefficient from sales and EBIT is significant with effect to leverage as the calculated t value is lower than the table value for $\upsilon = 3$ at 5% level of significance (3.182) and at 1% level of significances (5.841). However, there is a significant relationship between the investment and borrowings with effect to leverage and FD as most of the firms' F-value is higher than the table value for $\upsilon = 4$ at 5% (6.39) and at 1% level of significances (15.98). Also there is a significant relationship between the net worth and borrowings as well as a relationship between the net worth and CL with respect to FD as the computed F value is higher than the table value; there is a significant relationship between the net worth and FL with effect to FD.

Profitability ratios of the firms, AMI from (2004–2008), AIL in (2005–2006 and 2008), ARML (2004–2008), BBIL (2004–2008), BDMCL (2006–2008), CPML (2004–2008), IRSIL (2008), MTIL (2004–2008), PSL (2004–2008, VLTL (2008), APL (2004–2005), FPL (2004–2006), GDPML (2004), and JTFL (2004, 2006, and 2007) show negative values, thereby proving that the firms faced loss during those years. Firms like ACML, AFL, ASL, APL, BASML, BCIL, etc. show positive profitability ratios, which prove that there is a significant growth in the profit throughout the study period. Among these firms, ACML, AFL, ASL, APL, BASML, DTL, EICCL, GSML, GSML and PIL show higher profitability ratios, which prove that they have gained huge profit over the study period.

ACML, ASL, BCIL, BBIL, CPML, FPL, GDPML, etc. show an increasing trend in their current ratios, which helps the firms to meet their current obligations. The DER for the year 2008 for firms viz., AMI (0.23), AIL (1.08), ACML (2.51), AFL (1.56), ASL (1.63), APL (0.17), BASML (2.65), BCIL (1.34), BDMCL (10.22), etc. except for firms viz., BASML, BDMCL, DTL, JTFL, where the values are less than 2 and firms viz ARML, CPML and BBIL show 0 value, thereby leading to conclude that there is a higher degree of protection for those firms which show less DER.

CONCLUDING REMARKS

Leverage represents the influence of one financial variable over some other related financial variables, while business risk refers to the volatility of EBIT. In other words, leverage refers to the use of fixed costs in an attempt to increase OP. OL is due to fixed operating costs associated with the production of goods or services, and FL is due to the existence of fixed financing costs. Both types of leverages affect the level and volatility of the firm's after tax earnings and thereby the firm's overall risk and return.

FL is employed in the hope of increasing the return to common stockholders. The purpose of the leverage is to maximize the profits; a high degree of leverage gives a huge increase in profits, however one can't ignore that the higher the degree of leverage the greater is the risk. Hence, the term *risk* implies the degree of uncertainty the firm has to face in meeting fixed payment obligations, so it is said to be a *double-edged weapon.* If it is used in the right (appropriate) way it serves the purpose (positively) very well, and if not it acts reversely (negatively); its effects are favourable or unfavorable depending upon the use of it.

Increasing leverage is the easiest way to increase returns in a rising market, and there were incentives to chase these returns and to ignore or downplay the risks. FL may also be an effective weapon in the battle for corporate control. Certain Employee Stock Ownership Plans (ESOPS) are 'leveraged', in that the trust fund borrows funds in order to quickly place a large number of the firm's shares in friendly hands.

In the present study 25 textile firms, which are listed in Bombay Stock Exchange, are taken as sample units for the study period on a year-to-year basis from 2004 to 2008. Firms viz ACM, AFL, ASL, BASML, BCIL, GSM, GDPM and GJML show a *significant growth rate in financial, operating and combined leverages.* The selected financial variables viz sales, EBIT, investment, borrowings and net worth influence the leverage in both the positive and negative way. As a general rule, a firm having low FL should have a high operating leverage and vice versa. Since OL is related to the fixed cost of the firms these firms have large fixed cost and thus much of the marginal contribution must be applied to cover fixed cost. Firms i. e. DTL, FPL, GSML, PVL and GJML have high OL and low FL. Firms viz AFL, ASL, FPL, GSML and OCL show high OL. In this case the firm should finance its new investment from sources other than debt, which will help in reducing the OL.

A low OL means high controllable costs and low uncontrollable costs or fixed costs and therefore leads to a less risky situation. A high FL suggests that a firm has taken adequate help from fixed interest bearing securities, in planning its CS, in order to maximize the return to the shareholders. CL is the result of these two leverages and measures the total risk.

In the present study firms viz APL, GJML have low OL and high FL. High leverage generates interest payments that may be highly relative to current levels of cash flow. The results show that the effect of high leverage is likely to influence the divisional allocation of investment within a firm, which further suggests that high leverage has the potential to distort a firm's internal investment policy. This evidence, however, comes from a sample of firms that chose to undergo a dramatic increase in leverage. Since firms have self-selected into the sample, it is possible that the indirect costs of high leverage are less important.

Leverage is positively related to firm's value for low growth firms, but negatively related to firm's value for high growth firms. Much of the evidence regarding the effect of leverage on investment comes from the analysis of firm-level data, while the effect of leverage in determining the level of the overall firm's investment is clearly of interest. The effect of leverage on firms' investment policies has been a question of long standing interest. In the presence of market imperfections, leverage has the potential to have an important influence on investment decision. The managerial ownership aligns the interests of shareholders and managers through eliciting increased leverage, whereas institutional investors discourage managerial overspending through the board of directors and encourage firms to preserve borrowing capacity. This finding *supports the theory that leverage has a disciplining role on this kind of firms and it is also in conformity with the results of the previous literature.*

SUGGESTIONS AND SCOPE FOR FURTHER STUDIES

Suggestions

- Firms i. e. ASL, AFL and GSML show high FL and OL, thus binding risky, and these firms have high fixed cost and high level of debt financing. This combination is risky as both the leverages are high, and these risks can be avoided by managing the leverages to the appropriate level.
- Firms i. e. DTL, FPL, GSML, PVL and GJML have high OL and low FL;

hence these firms should finance their new investment from sources other than debt so that it may help them in reducing the OL.

- Firms i. e. APL, BASML, BCIL, GDPML and GJML show an almost balanced OL and FL, which is not a risky situation. FL is employed in the hope of increasing the return to the common shareholders and the leverage is favorable in these firms.
- Firms i. e. AFL, ASL, FPL, GSML and OCL show high OL. Since OL is related to the fixed cost, these firms have large fixed cost, thus much of their marginal contribution must be applied to cover fixed cost. If the firm has high OL, even a small change in sales will have a large effect on EBIT. If the change is a small rise in sales, profits will rise dramatically, but if the change is a small decline in forecasted sales, EBIT may be wiped out and loss may be reported. As a general rule, firms do not like to operate under conditions of a high OL. This is a high risk situation in which a small drop in sales can be excessively damaging to the firm's efforts to achieve profitability. The firm prefers to operate sufficiently above break-even to avoid the danger of a fluctuation in sales and profits. In this case these firms should be careful while making FDS.
- Profitability ratio of firms i. e., ACML, AFL, ASL, APL, BASML, BCIL, etc shows a positive increase in their ratios and there is a significant growth in their profit rate, hence these firms could expect an increase in EBIT in the years to come, provided other things (variables) remain the same.
- ACML (19%), BASML (87%), BCIL (55%), VLTL (13%), JTFL (93%), GSML (6%), GDPML (20%), and BDMCL (7%) show a significant growth in their profit level, thus income comprises the variable cost and fixed cost as the income increases and the variable cost also increases but the fixed cost remains stable, thus more profit could be gained by these firms.
- Efficiency ratio of firms i. e. AFL (1.4), MTIL (1.03), EICCL (1.57), IRSIL (1.06), GJML (1.64), GSML (1.4), FPL (1.06), and DTL (1.72) >1, which shows more income than the average asset and thus increases in the ratio.
- FL, OL and CL are influenced by the selected financial variables such as net worth, investment and borrowings. CL of firms i. e., AFL, ASL, BCIL, GSML, GDPML, IRSIL and OCL is high. CL is used to compare changes in revenues with changes in EBT. It is viewed as the total

impact of fixed charges in the firm's operating and financial structure to magnify the effects of changes in sales on the firm's EPS, a proper balance between the two leverages can only provide an ideal CL. Maintaining an ideal situation would require a firm to have low OL and high FL, in order to keep the risk profile of the firm within a reasonable limit and maximize the return to the shareholders. The findings suggest several novel insights into the interdependency of CL and FD, which helps the firms to determine the business risk in terms of FL and OL.

Scope for Further Studies

The present study suggests a number of interesting avenues for future research. Further studies can be conducted also in the following areas:

- The relationship between ownership structure and leverage based on the size of the firms as the significance of the relationship differs with the size.
- The important implications on the relationship between leverage and investment in emerging markets where crises and macroeconomics fluctuations are very common and business risk can be dogged.
- The leverage influence on the resources of diversified firms, which undergo recapitalization, to determine the effects on the business environment.
- The relationship between CL and product differentiation strategy, as drastic product differentiation strategies allow firms with healthy balance sheets to sustain superior product market rents, while firms with high leverage and poor balance sheets should be deterred from adopting overly drastic differentiation choices.

References

Ang, J. S. 1992. 'On the Theory of Finance for Privately Held Firms.' *The Journal of Small Business Finance* 1 (3): 185–203.

Benito, A., and J. Whitley. 2003. 'Implicit Interest Rates and Corporate Balance Sheets: An Analysis using Aggregated and Disaggregated UK Data.' Working Paper 193, Bank of England, London.

Chen, C. J. P., S. Chen, and X. J. Su. 2001. 'Profitability Regulations, Earnings Management, and Modified Audit Opinions: Auditing.' *A Journal of Practice and Theory* 20 (2): 8–30.

Choe, Y. S. 1994. 'The Substitution Effects of Short-Term Debt for Long-Term Debt on the Expected Returns of Common Stocks.' *Asia Pacific Journal of Management* 11 (2): 187–203.

Denis, D. J., and D. K. Denis. 1993. 'Managerial Discretion, Organizational Structure, and Corporate Performance: A Study of Leveraged Recapitalizations.' *Journal of Accounting and Economics* 16 (1–3): 209–36.

Drobetz, W., and M. C. Grüninger. 2007. 'Corporate Cash Holdings: Evidence from Switzerland.' *Financial Markets and Portfolio Management* 21 (2): 293–324.

Faccio, M., H. P. L. Lang, and L. Young. 2004. 'Debt and Expropriation.' Working paper, Vanderbilt University, Nashville, TN.

Faulkender, M. 2004. 'Cash Holdings among Small Businesses.' Working Paper, University of Maryland, Robert H. Smith School of Business.

Faulkender, M., and R. Wang. 2006. 'Corporate Financial Policy and the Value of Cash.' *Journal of Finance* 61 (4): 1975–90.

Ferreira, M. A., and A. S. Vilela. 2004. 'Why do Firms Hold Cash? Evidence from EMU Countries.' *European Financial Management* 10 (2): 295–319.

Francis, J. R., I. K. Khurana, and R. Pereira. 2005. 'Disclosure Incentives and Effects on Cost of Capital around the World.' *The Accounting Review* 80 (4): 1125–62.

Gelb, D. 2000. 'Managerial Ownership and Accounting Disclosures: An Empirical Study.' *Review of Quantitative Finance and Accounting* 15 (2): 169–85.

Gelb, D., and P. Siegel. 2000. 'Intangible Assets and Corporate Signaling.' *Review of Quantitative Finance and Accounting* 15 (4): 307–23.

Gordon, R. H., and J. K. Mackie Mason. 1990. 'Effects of the Tax Reform Act of 1986 on Corporate Financial Policy and Organizational form.' In *Do Taxes Matter: The Impact of the Tax Reform Act of 1986*, edited by J. Slemrod, 91–131. Cambridge, MA: MIT Press.

Honohan, P. 1997. 'Banking System Failures in Developing and Transition Countries: Diagnosis and Predictions.' BIS Working Paper 39, Basel.

Huffman, L. 1983. 'Operating Leverage, Financial Leverage, and Equity Risk.' *Journal of Banking and Finance* 7 (2): 197–212.

Huffman, S. P. 1989. 'The Impact of the Degrees of Operating and Financial Leverage on the Systematic Risk of Common Stocks: Another Look.' *Quarterly Journal of Business and Economics* 28 (1): 83–100.

Iona, A,. L. Leonida, and A. Ozkan. 2004. 'Determinants of Financial Conservatism: Evidence from Low-Leverage and Cash-Rich UK Firms.' Working Paper 04/01, University of York, Department of Economics.

Jensen, M. C. 1986. 'Agency Costs of Free Cash Flow, Corporate Finance and Takeovers.' *American Economic Review* 76 (2): 323–29.

Jensen, M. C., and W. H. Meckling. 1976. 'Theory of the Firm: Managerial

Behavior, Agency Costs and Ownership Structure.' *Journal of Financial Economics* 3 (3): 305–60.

John, T. A. 1993. 'Accounting Measures of Corporate Liquidity, Leverage, and Costs of Financial Distress.' *Financial Management* 22 (3): 91–100.

Jugurnath, B., M. Stewart, and R. Brooks. 2008. 'Dividend Taxation and Corporate Investment: A Comparative Study Between the Classical System and Imputation System of Dividend Taxation in the United States and Australia.' *Review of Quantitative Finance and Accounting* 31 (4): 209–24.

Kim, C., D. C. Mauer, and A. E. Sherman. 1998. 'The Determinants of Corporate Liquidity: Theory and Evidence.' *Journal of Financial and Quantitative Analysis* 33 (3): 335–58.

Kytonen, E. 2005. 'Corporate Liquidity Holdings: An Empirical Investigation of Finnish Firms.' Paper presented at 22th Summer Seminar in Business and Economics, Jvyäskylä, 8–9 June.

Lang, L., E. Ofek, and R. M. Stulz. 1996. 'Leverage, Investment, and Firm Growth.' *Journal of Financial Economics* 40 (1): 3–29.

Leary, M, and M. R. Roberts. 2005. 'Do Firms Rebalance their Capital Structure?' *Journal of Finance* 60 (6): 2575–619.

Li, R. J., and G. V. Henderson. 1991. 'Combined Leverage and Stock Risk.' *Quarterly Journal of Business and Economics* 38 (1): 18–39.

Li, W., and Y. Tang. 2007. 'An Evaluation of Corporate Governance Evaluation, Governance Index (CGINK) and Performance: Evidence from Chinese Listed Firms in 2003.' *Frontier of Business Research in China* 1 (1): 1–18.

Lord, R. A. 1996. 'The Impact of Operating and Financial Risk on Equity Risk.' *Journal of Economics and Finance* 20 (3): 27–38.

Mahajan, L. Y. 1999. 'Corporate Financing and Investment Decisions under Asymmetric Information.' *International Advances in Economic Research* 5 (1): 148–9.

Mandelker, G. N., and S. Ghon Rhee. 1984. 'The Impact of the Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock.' *Journal of Financial and Quantitative Analysis* 19 (1): 45–57.

Merton, R. 1974. 'On the Pricing of Corporate Debt: The Risk Structure of Interest Rates.' *Journal of Finance* 29 (2): 449–70.

Moon, D. and K. Tandon. 2007. 'The Influence of Growth Opportunities on the Relationship Between Equity Ownership and Leverage.' *Review of Quantitative Financial Accounting* 29 (3): 339–51.

Myers, S. 1977. 'Determinants of Corporate Borrowing.' *Journal of Financial Economics* 5 (2): 147–75.

Myers, C., S. Majluf, and S. Nicholas. 1984. 'Corporate Financing and Investment Decisions. *Journal of Financial Economics* 13 (2): 187–221.

Olafsson, S. 2003. 'Making Decisions under Uncertainty Implications for High Technology Investments.' BT *Technology Journal* 21 (2): 170–83.

Opler, T., L. Pinkowitz, R. Stulz, and R. Williamson. 1999. 'The Determinants and Implications of Corporate Cash Holdings.' *Journal of Financial Economics* 52 (1): 3–46.

Parrino, R., and M. S. Weisbach. 1999. 'Measuring Investment Distortions Arising from Stockholder-Bondholder Conflicts.' *Journal of Financial Economics* 53 (1): 3–42.

Raad, E., and H. K. Wu. 1994. 'Acquiring Firms' Stock Returns: Methods of Payment Change in Leverage, and Management Ownership.' *Journal of Economics and Finance* 18 (1): 13–29.

Rajan, R. G., and L. Zingales. 1995. 'What do We Know About Capital Structure? Some Evidence from International Data.' *Journal of Finance* 50 (5): 1421–60.

Ruland, W., and P. Zhou. 2005. 'Debt, Diversification, and Valuation.' *Review of Quantitative Finance and Accounting* 25 (2): 277–91.

Saibal, G. 2005. 'Does Leverage Influence Banks' Non-Performing Loans? Evidence from India.' *Applied Economics Letters* 12 (1): 913–8.

Stulz, R. 1988. 'Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control.' *Journal of Financial Economics* 20 (1): 25–54.

Vogt, S. C. 1994. 'The Cash Flow Investment Relationship: Evidence from US Manufacturing Firms.' *Financial Management* 23 (2): 3–20.

Whited, T. 1992. 'Debt, Liquidity Constraints, and Corporate Investment: Evidence from Panel Data.' *Journal of Finance* 47 (4): 1425–61.

Ali lahko tehnologija omogoči boljše finančne učinke? Raziskava v indijskih poslovnih bankah

Dhiraj Sharma

Vprašanje, ali lahko tehnologija omogoči boljše finančne učinke in izboljša storilnost, je bilo predmet številnih razprav. Pričujoči članek poskuša s pomočjo razvrščanja bank glede na rabo tehnologije proučiti finančno učinkovitost indijskih bank znotraj njihove bančne skupine. Da bi omogočili časovno primerjavo, je bilo obdobje proučevanja razdeljeno na dva dela: na obdobje uvajanja nizkih tehnologij in na obdobje uvajanja visokih tehnologij. Izsledki kažejo, da so v celoti informatizirane banke finančno uspešnejše od bank, ki so le delno informatizirane. Še več, učinkovitost skoraj vseh proučevanih bank se je v obdobju uvajanja visokih tehnologij izredno izboljšala. Vendar pa je v indijskem bančnem sektorju korelacija med uvajanjem tehnologij in finančno učinkovitostjo negativna, čeprav je nizka in ni statistično značilna.

Ključne besede: paradoks storilnosti informacijske tehnologije, informacijska tehnologija, finančna učinkovitost, indijske banke, razmerje med odhodki in prihodki
Klasifikacija JEL: O33, G21, M15
Managing Global Transitions 10 (1): 3–28

Tehnologija, bogastvo in sodobni management tehnologij

Slavko Dolinšek in Peter Štrukelj

V članku predlagamo nekoliko drugačno konceptualizacijo tehnologije, temeljnega razmerja med tehnologijo in bogastvom v družbi, tehnološke sposobnosti in managementa tehnologij. Osnova za predlagane konceptualizacije je sedanja splošna in relevantna tehnološka praksa. Da bi deducirali te konceptualizacije, smo proučili danes največja podjetja na svetu v različnih proizvodnih in tehnoloških sektorjih, kakor tudi splošno poročanje o tehnologiji iz tehnološko usmerjenih medijev. Te temeljne konceptualizacije bi utegnile zanimati vse, ki se praktično ali teoretično ukvarjajo s tehnologijo, bogastvom, tehnološko sposobnostjo in managementom tehnologij in ki hočejo razumeti bistvo tehnologije in njenih odnosov do pojavov, kot recimo bogastvo in management (»dobiti celovito sliko«). Na koncu ponudimo razlago, zakaj v

današnjih podjetjih obstaja potreba po managiranju tehnologij in kaj je nova paradigma managementa tehnologij – s kakšnimi novimi izzivi in trendi se mora soočiti sodobni management tehnologij.

Ključne besede: tehnologija, bogastvo, tehnološka sposobnost, management tehnologij, tehnološki trendi
Klasifikacija JEL: I31, J30, M10, O3
Managing Global Transitions 10 (1): 29–49

Konkurenčnost obmejnih regij in management turističnih destinacij

Ksenija Vodeb

Konkurenčnost obmejnih regij je pogosto nižja od konkurenčne sposobnosti regij, ki so v notranjosti posamezne države. Večinoma so regije, ki predstavljajo konec enega območja in začetek drugega, gospodarsko manj uspešne. Turizem kot razvojna metoda zagotavlja možnosti za razvoj turističnih destinacij v krajih, kjer turistične privlačnosti in viri pomenijo konkurenčne in komparativne prednosti. Prispevek obravnava modele za oceno konkurenčnosti turizma in destinacijski management kot nepogrešljiv element za doseganje višje ravni konkurenčnosti turistične destinacije. Raziskava se osredotoča na turistične ponudnike obmejnih regij ob slovensko-hrvaški meji. Zanimala so nas njihova stališča o turizmu, regionalni konkurenčnosti in potencialnih turističnih destinacijah kot posledici čezmejnega sodelovanja med državama. Rezultati kažejo, da je konkurenčnost mogoče izboljšati s strateško metodo načrtovanja in upravljanja čezmejnih turističnih destinacij.

Ključne besede: turistična destinacija, konkurenčnost in turizem, management turistične destinacije, čezmejno sodelovanje
Klasifikacija JEL: O10, M20
Managing Global Transitions 10 (1): 51–68

Omejitve človeškega kapitala v Južni Afriki: analiza na ravni podjetij

P. J. Ewert Kleynhans in Johannes Riaan Labuschagne

Članek obravnava omejitve človeškega kapitala v južnoafriškem gospodarstvu in resnost teh omejitev za podjetja v tej državi. Ključni omejitvi človeškega kapitala, obravnavani v tem članku, sta nezadostno izobražena delovna sila in anomalije na trgu dela. Dejavnike povečanja produktivnosti dela v proizvodnih podjetjih smo proučili s pomočjo

regresijske analize. Ugotovili smo, da se vpliv izobrazbe in anomalij na trgu dela na storilnost delavcev spreminja. Metoda glavnih osi in pojasnjevalne spremenljivke so dale podobne rezultate. Raziskava je pokazala, da največji delež skupne variance pojasnjujejo latentne spremenljivke, med njimi izobrazba, usposobljenost, plačilo, regija ter podpora in učinkovitost urada za sektorsko izobraževanje in usposabljanje.

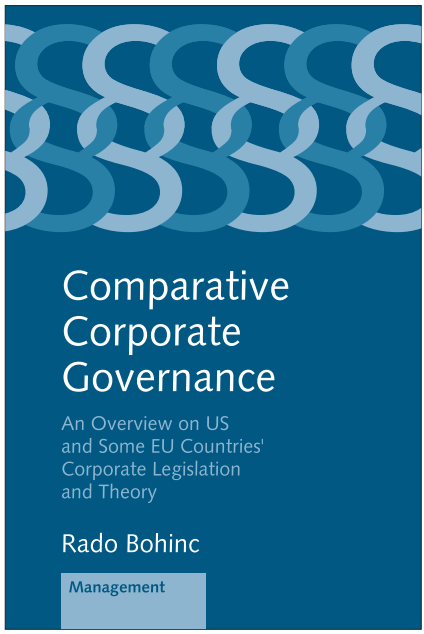
Ključne besede: omejitve človeškega kapitala, storilnost, učinkovitost, delo, izobraževanje, proizvodnja, Južna Afrika
Klasifikacija JEL: L26, D24, J24
Managing Global Transitions 10 (1): 69–86

Finančne odločitve in celotni vzvod podjetij v indijski tekstilni industriji

Ramachandran Azhagaiah in Selvaraj Sathia

Na nepopolnih trgih lahko finančni vzvodi pomembno vplivajo na odločanje o naložbah. Če podjetju zadolževanje prinese dobiček, imajo delničarji večje donose na delnico, kot bi jih imeli, če podjetje ne bi imelo dolga; finančni vzvodi so namreč merilo dolgoročnega tveganja. V pričujoči študiji smo za vzorec vzeli petindvajset tekstilnih podjetij, ki so v obdobju od 2004 do 2008 kotirala na bombajski borzi. Raziskava je pokazala, da podjetja ACM, AFL, ASL, BASML, BCIL, GSM, GDPM in GJML kažejo značilno stopnjo rasti v finančnem, obratnem in skupnem zadolževanju.

Ključne besede: kapitalska struktura, finančni vzvodi, poslovni vzvodi, celotni vzvod podjetij, finančne odločitve, kazalnik finančnega vzvoda
Klasifikacija JEL: G30, G32, G35
Managing Global Transitions 10 (1): 87–114



Comparative Corporate Governance: An Overview on US and Some EU Countries' Corporate Legislation and Theory

Rado Bohinc

December 2010
ISBN 978-961-266-065-9
545 pp., 16 × 24 cm

Book club price 35,40 €
Regular price 59,00 €

www.zalozba.fm-kp.si

The Comparative Coporate Governance monograph contains the extensive research the author has done on the corporate governance systems of the USA, EU, UK, Germany, France, Slovenia and some other countries of the EU and out of EU. It analyses the differences and similarities, advantages and disadvantages, of the US single board or one-tier system in comparison with the European two-tier corporate governance systems.
Following an in-depth presentation of corporate governance in general, provided with chapters on the general theory on corporate governance, the main opened issues of corporate governance, sources of law, OECD principles of corporate governance and OECD guidelines for state owned enterprises, the book focuses on the types of business organizations and ownership structures both in the US and EU corporations, and then concentrates on explaining and analysing the corporate governance systems in the EU, the USA, the United Kingdom, Germany, France and Slovenia, emphasising the features inherent to each of these systems.

Managing Global Transitions
International Research Journal

AIMS AND SCOPE

The journal *Managing Global Transitions* is aimed at providing a forum for disseminating scholarship focused on transitions. The journal seeks to publish ground breaking work in management research that will provide integrated and diverse perspectives on the processes of change and evolution in a broad range of disparate fields, including systems theory, leadership development, economics, education, industrial relations, law, sociology, informatics, technology, decision-making theory, and action learning. To further the understanding of transition environments internationally the journal aspires to enhance the availability of case studies and analysis of data from different cultural environments in public, non-profit, and corporate contexts.

INFORMATION FOR AUTHORS

Manuscripts are accepted on the understanding that they are original and not under simultaneous consideration by any other publication. All manuscripts are double-blind peer reviewed.
Manuscripts should be prepared following *The Chicago Manual of Style.*

Manuscript Style

- Manuscripts should be submitted electronically via e-mail. We accept files created with all major word processing packages, but prefer MS Word and LaTeX.
- The editors reserve to right to return to authors, without peer review, improperly formatted manuscripts.
- Papers should be between 5000 and 6000 words in length, accompanied by a 100–150-word abstract, and no more than five key words and two areas of JEL classification (see http://www.aeaweb.org/journal/jel_class_system.html) on a separate sheet.
- The title page must list full title, author(s) address, and e-mail.
- Paper size should be A4. Margins should be set for a 25 mm (1 in.) top, bottom, left, and right. The point size should be 12 and the font should be Times New Roman. Italics should be used for emphasis and bold for headings. Put blank lines between paragraphs and differentiate major and minor headings.
- Footnotes are not permitted. Endnotes are permissible but should be kept to a minimum.

Reference Style

The author-date system of citation for references should be used in the text, followed by page number if a direct quotation is given, e.g., (Jackson 1979, 181). The alphabetized reference list should be titled 'References' with entries in the following format:

Anderson Analytics. 2007. 'Brands and Countries.' http://www.andersonanalytics.com/reports/BrandAndCountries.pdf

Beech, M. H. 1982. 'The Domestic Realm in the Lives of Hindu Women in Calcutta.' In *Separate Worlds: Studies of Purdah in South Asia,* edited by H. Papanek and G. Minault, 110–38. Delhi: Chanakya.

Kim, J., S. J. Lee, and G. Marschke. 2005. 'The Influence of University Research on Industrial Innovation.' NBER Working Paper Series 11447, National Bureau of Economic Research, Cambridge, MA.

Jackson, R. 1979. 'Running Down the Up-Escalator: Regional Inequality in Papua New Guinea.' *Australian Geographer* 14 (5): 175–84.

Lynd, R., and H. Lynd. 1929. *Middletown: A study in American Culture.* New York: Harcourt, Brace and World.

University of Chicago Press. 2010. *The Chicago Manual of Style.* 16th ed. Chicago: University of Chicago Press.

INDEXING AND ABSTRACTING

Managing Global Transitions is indexed/abstracted in the International Bibliography of the Social Sciences, EconLit, DOAJ, EconPapers, Cabell's, EBSCO, and ProQuest.

The journal is supported by the Slovenian Book Agency.

ISSN 1854-6935 (online)

Managing Global Transitions
International Research Journal

VOLUME 10 · NUMBER 1 · SPRING 2012 · ISSN 1854-6935

UNIVERZA NA PRIMORSKEM
UNIVERSITÀ DEL LITORALE
FAKULTETA ZA MANAGEMENT
FACOLTÀ DI MANAGEMENT