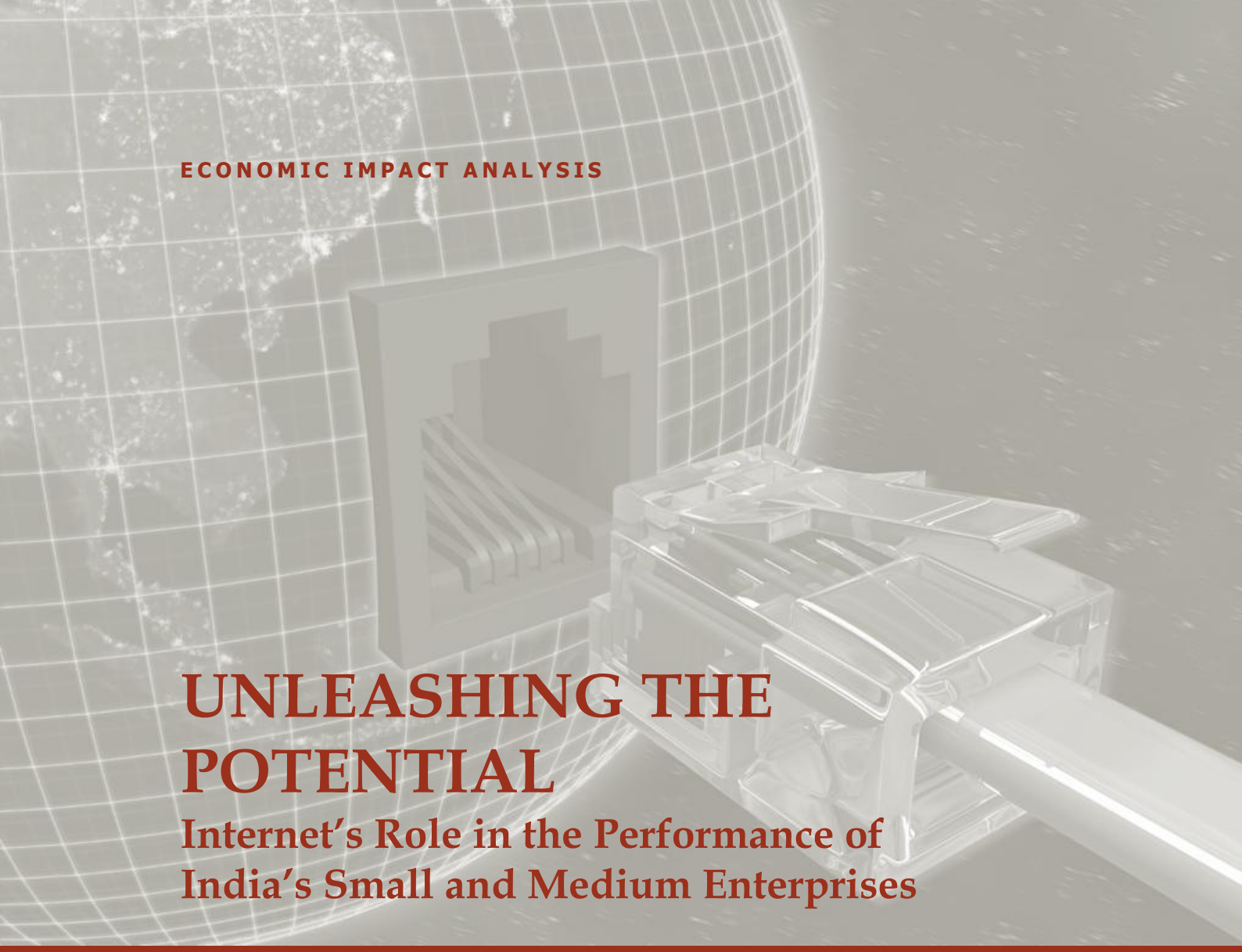


ECONOMIC IMPACT ANALYSIS

UNLEASHING THE POTENTIAL

Internet's Role in the Performance of India's Small and Medium Enterprises

NATHAN ASSOCIATES INC.

FICCI

India's MSME sector is growing at 17% per annum; accounts for 17% of GDP, 45% of manufacturing output and 40% of exports

951 SMEs surveyed; covering 14 Industrial Clusters in 19 Geographical Clusters of India

Internet use in SMEs can lead to 32% higher revenues, 43% higher profits, 37% higher employment, 35% higher employment growth and 32% more customers

Perceived benefits of the Internet: 69% SMEs report increase in customers, 65% report increase in profits, 64% in sales, 63% in geographic reach and 44% in employment

27% of Internet using SMEs engage in e-commerce.

61% of Internet using SMEs worry about security. 44% of Internet-non using SMEs feel IT equipment costs are too high and 28% feel Internet connection costs are too high for them to adopt the Internet.

Contents

Executive Summary 1

1. Introduction 1

2. India's SMEs and the Rise of the Internet 3

3. Study Methodology 7

4. Findings 9

5. Recommendations 17

Appendix. Regression Analysis 23

Illustrations

Figures

Figure 1 Broadband Users in India: Speed and Type of Connection 5

Figure 2 Classification of Surveyed SMEs by Geography and Subsector 7

Figure 3 Hypotheses 8

Figure 4 SMEs Owning Websites, by Subsector 10

Figure 5 Average Monthly Use of the Internet (in GB), by Subsector 10

Figure 6 Surveyed Respondents' Perceived Impact of Internet on Revenue, Profitability, Innovation, Costs, Coverage, Productivity, and Employment 11

Figure 7 Issues Facing SMEs 14

Figure 8 Effect of Costs of Equipment and Internet Connection on Internet Adoption 15

Figure 9 Price of a Dell Inspiron 14z Ultrabook in 12 Countries (purchasing power parity in US$) 17

Figure 10 Internet Penetration, State GDP, and State Expenditure on IT and E-Governance 19

Tables

Table 1 International Rates for Internet Use by Individuals and for Household Access to Computers and the Internet, 2005 and 2010 4

Table 2 Summary Statistics 9

Table 3 Average Internet Set up Cost, Monthly Charges, and Average Use 11

Table 4 Difference in the Performance of Internet-using versus Non-using SMEs 12

Table 5 Market Share of Five Major ISPs, December 2012 18

Table 6 Herfindahl–Hirschman Index for ISPs in Various Countries 18

Executive Summary

Small and medium sized firms contribute significantly to GDP and job creation in India. The economy grows as they grow. However, to grow, SMEs need the right business and regulatory environment, including modern infrastructure and technological tools. In the last 15 years, the Internet has turned out to be one of the most promising tools which SMEs can leverage for their growth.

Our survey of 951 small and medium enterprises in various industrial and geographical clusters across India shows that they have the technical skills, entrepreneurial spirit, and manpower to profit from adopting the Internet. Of those who do use the Internet, 69 percent have seen an increase in customers, 65 percent an increase in profits, 64 percent an increase in sales, 63 percent an increase in their geographic reach to customers, and 44 percent an increase in employment. Controlling for factors such as SME's investment in plant and machinery, the age, sex and education of personnel, and ownership type, we found that using the Internet for operations increased the SME's revenue by 51 percent, profits by 49 percent, customers by 7 percent, and employment by 4 percent. Further, SMEs that use the Internet intensively enjoy more financial growth than those who use it less. An SME that uses on average 10 GB of Internet data per month has 7 to 32 percent higher revenue, 8 to 43 percent higher profit, 13 percent higher employment, 22 percent higher employment growth, and 18 percent more customers than an SME using only 5 GB.

So why don't more small firms in India use the Internet or use it to its full potential? We found three main reasons:

1. High IT equipment and connection costs
2. Weak environment for electronic commerce
3. Lack of awareness of Internet use and lack of skills.

The solution?

- Lower costs for IT equipment and Internet connection by encouraging competition in the IT market.
- Improve infrastructure so Internet service is fast and reliable.
- Strengthen the environment for e-commerce by improving supply chains, facilitating use of credit/debit cards, and improving regulations governing online activities.
- Enforce progressive government policies that promote unfettered use of Internet and its adoption by SMEs, thus empowering them to expand internationally.
- Improve computer-related education, vocational training, and skill development among youth and develop a computer literate and Internet savvy workforce.
- Publicize the success of SMEs that use the Internet through government or industry-sponsored events, and promote the registration of SMEs with a goal to increase Internet adoption by SMEs.

1. Introduction

Growing at 17 percent and outpacing the industrial sector's growth rate by 8 percent, India's SME sector can revolutionize India's economic growth trajectory.

In countries around the world, the Internet is helping small companies with big aspirations realize their dreams—by minimizing barriers of space and time, connecting them to customers near and far, and improving their business processes. But the benefits of the Internet vary on the basis of a firm's size, geographic reach, and products and services supplied. Many small and medium-size enterprises (SMEs), for instance, lack the resources necessary to absorb and apply new technologies effectively. These same SMEs contribute significantly to revenue and employment in India. They could grow by leaps and bounds in the right business and regulatory environment and with the right technological tools, chief among them, the Internet. What is preventing them from using the Internet and using it to its full potential for their business?

This independent study conducted by Nathan Economic Consulting India Private Limited (Nathan India) with knowledge partner Federation of Indian Chambers of Commerce and Industry (FICCI) and Google India as the sole funding partner, answers this question. We,

- examine the economic contributions of SMEs in India, the rise of the Internet in general, and the lag in adoption and use of the Internet by SMEs despite the many obvious benefits (Section 2);
- describe our methodology (Section 3); and
- present our findings (Section 4); and
- provide recommendations based on those findings (Section 5).

The purpose of our study is to help policymakers understand the impact of the Internet on SME performance—and unleashing the potential of this powerful tool. Equipped with this knowledge, policymakers can take steps to facilitate Internet use and encourage SMEs to use it to their benefit and the benefit of India's economy.

2. India's SMEs and the Rise of the Internet

SMEs are critical to economic growth and employment in all developing countries; in India they employ 73 million people and account for 17 percent of GDP, 45 percent of manufacturing output and 40 percent of exports.[1]

The government of India recognizes the value of SMEs, particularly for the development of rural areas, and government policies stress their role in improving the country's economy and welfare. The Micro, Small, and Medium Enterprises Development (MSMED) Act of 2006 created the National Board for MSMEs,[2] which examines factors affecting enterprise development and reviews related policies and programs.[3] Other programs support vocational training for new entrepreneurs, the development of financial markets for MSMEs, and marketing. Under the Union Budget 2013, MSMEs are assured benefits for up to three years after they "outgrow" their initial classification as micro, small, or medium.[4]

Still, India's SMEs are hard put to grow consistently when they lack capital, knowledge of new techniques of production, suitable technology, effective marketing strategies and affordable skilled labor.

How India Defines Micro, Small, and Medium Enterprises

SMEs are under the purview of the Ministry of Micro, Small, and Medium Enterprises. In accordance with the Micro, Small, and Medium Enterprises Development (MSMED) Act of 2006, the Ministry defines SMEs by level of investment in plant and machinery:

- A small service enterprise is one whose investment is between INR 10 Lakh and INR 2 Crores (US$17,000-US$0.3 million); a medium service enterprise is between INR 2 Crores and INR 5 Crores (US$0.3 million-US$0.9 million).
- A small manufacturing enterprise is one whose investment is between INR 25 Lakh and INR 5 Crores (US$43,000-US$0.9 million); a medium manufacturing enterprise is between INR 5 Crores and INR 10 Crores (US$0.9 million-US$1.7 million).

SMEs can benefit from reforms that make it easier for them to secure technical and financial assistance—but they can also benefit from the Internet.

Internet technology can be instrumental in SME growth in developing countries, as evidenced by the success of e-commerce companies like Alibaba.com in China and Flipkart in India. A recent study in Australia shows that small businesses that use the Internet extensively earn twice as much as those who use it less.[5] How much businesses use the Internet is in part a reflection of general use—and Internet penetration rates have been increasing worldwide. Between 2005 and 2010, the number of individuals using the Internet increased by about 15 percentage points (Table 1). Europe and Central Asia experienced the highest increases in both Internet use and the number of households with computers.

Table 1

International Rates for Internet Use by Individuals and for Household Access to Computers and the Internet, 2005 and 2010

Region	Individuals Using the Internet (percent)		Households with a Computer (percent)		Households with Internet access at home (percent)	
	2005	2010	2005	2010	2005	2010
World	15.8	30.2	27.3	36.2	18.8	30.3
East Asia & Pacific	8.3	29.8	20.4	29.7	9	19.8
Europe & Central Asia	12.9	39.3	13.7	40.6	6.7	34.3
Latin America & Caribbean	16.5	34.0	17.2	29.7	9.7	20.7
Middle East & North Africa	8.3	21.0	9.7	30.4	9.1	22.7
South Asia	2.5	8.1	2.0	6.4	1.4	4.3
Sub-Saharan Africa	2.3	11.2	3.5	7.0	1.1	3.6

SOURCE: *The Little Data Book on Information and Communication Technology 2012, World Bank.*

Internet use in India is also increasing at a fast pace, driven by a youthful population, rising income and education, and advances in technology, such as mobile-based access and the roll out of third-generation (3G) services.[8] The number of users in India increased from 5.5 million in 2000[9] to about 150 million in 2013 and is projected to reach 348 million by 2017.[10][11] According to a survey conducted in 22 cities by the Internet and Mobile Association of India, nearly 21 million households owned personal computers or laptops in India as of March 2011. Of these, about 51 percent had Internet connections, from which 41 percent had high-speed broadband connections (82 percent of households with Internet connections). See Figure 1.

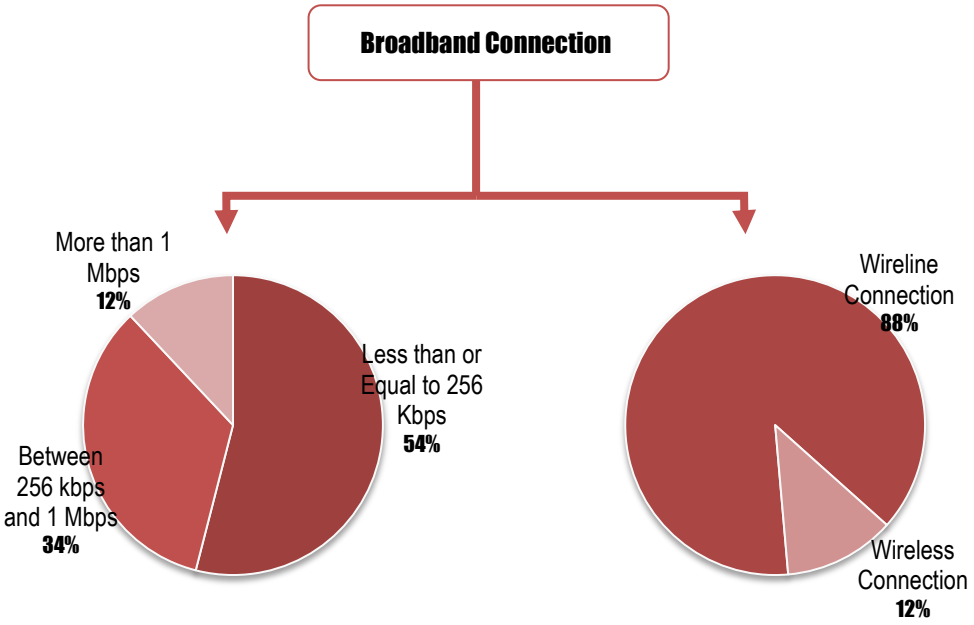
But Internet use by government and SMEs is lagging. In 2011-2012, the amount of India's GDP attributable to the Internet was modest 1.6 percent, amounting to US$30 billion.[12] Of this US$30 billion, the government contributed only 7 percent and the private sector 27 percent, compared to 33 percent by individual users and 33 percent by net exports.[13]

FLIPKART.COM: An Internet-based firm for an Internet-based market

In 2007 two graduates of the Indian Institute of Technology, Sachin and Binny Bansal, started Flipkart.com as an online bookstore using INR 4 Lakh (US$7,000). By 2013, the firm has raised INR 1,200 crore (US$200 million) from investors to take on the global e-commerce leader Amazon.[6] The firm gradually expanded its customer base by leveraging the increased use of the Internet in India. It diversified its product offering to include movies, music, electronics, apparel, shoes, and healthcare and beauty products. In FY 2011-2012, it reported revenue of INR 500 Crore (US$87 million), about 10 times its revenue in FY2010-11. Between FY2010-11 and FY2011-12, Flipkart.com also expanded its logistics from 7 cities to 37, and increased its customer base from 0.2 million to 2.08 million.[7]

NOTE: *US$/INR as of June 10, 2013, 1US$ = INR 57.2580*

Figure 1
Broadband Users in India: Speed and Type of Connection



Note: The data do not cover large corporations or conglomerates.
SOURCE: Report on Internet in India (I-Cube) 2011.

Nevertheless, India has the technical skills, the entrepreneurs, and the manpower to profit from a boom in Internet use by its SMEs. These small firms need only Internet-enabled devices, an Internet connection, and some basic skills to adopt the Internet and reap the rewards.

In enabling the transfer of large data and real time and time-delayed telecommunication, the Internet offers three main benefits for SMEs:[14]

- **Lower Transaction Costs.** The Internet facilitates buying and selling, consumer feedback, market and product research, and marketing. E-commerce applications reduce costs associated with making payments, customer service, product display, inventory management, and staff recruitment.
- **Broader Reach.** Through the Internet, SMEs can enter distant markets and target more customers, creating new channels for revenue generation. Social media enables inexpensive marketing as happy customers promote SMEs among their friends. Small businesses easily become global businesses via the Internet. With an expanded customer base, both domestically and internationally, these "micro-multinationals" can enjoy more revenue, profit, and productivity.
- **More Knowledge.** The Internet can improve SMEs' awareness of competitors and input costs, thus making innovation less costly in terms of time and money. It can also increase SMEs' knowledge of government initiatives and policies that support SMEs.

With such benefits possible, why aren't more SMEs taking advantage of the Internet and related technologies? Is more needed than devices, connections, and basic skill?

3. Study Methodology

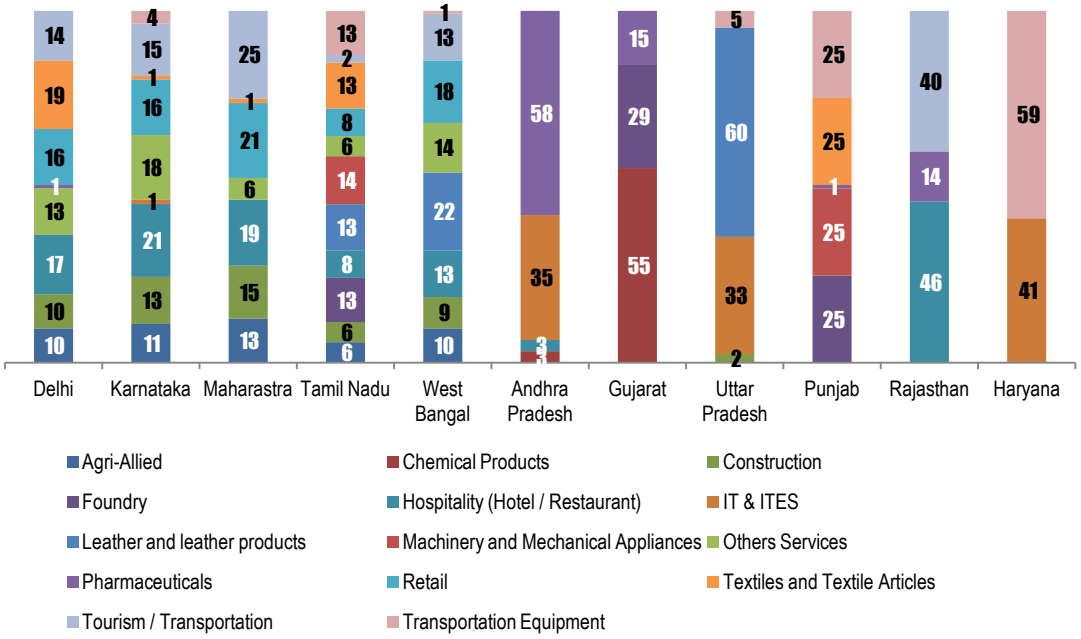
We surveyed 951 SMEs from 14 industrial clusters in 19 geographical clusters spread across 11 states.

After reviewing earlier studies of the impact of the Internet, we gathered data through a sample survey to clarify how Indian SMEs use and perceive the benefits of the Internet—and what keeps them from using it more. We surveyed SMEs from industrial and geographical clusters across the country.[15] In selecting clusters, our goal was to represent India's varying levels of development and the impact of Internet use on SMEs in manufacturing, services, and agriculture sectors.

Geographic clusters were selected on the basis of input from the Ministry of MSMEs and the United Nations Industrial Development Organization (UNIDO).[16] Industrial clusters were selected on the basis of their contribution to GDP and foreign trade. Within the manufacturing, services, and agriculture sectors, we concentrated on subsectors that contribute to foreign trade and which are expected to use the Internet in operations.[17] Keeping in mind the project schedule and budget, we settled on 19 geographical clusters in 11 states and 14 industrial subsectors in the geographical clusters.[18] This clustering method provides a good picture of SMEs in various sectors throughout the country.[19] Figure 2 shows the distribution of the surveyed SMEs.

Figure 2

Classification of Surveyed SMEs by Geography and Subsector



The survey questionnaire consisted of 83 questions on demographic and financial variables, Internet connectivity, and use of Internet applications. According to the Fourth Annual Census of MSMEs, about 7.67 Lakh (767 hundred thousand) SMEs were registered in India in 2007. Using a 90 percent confidence interval and a margin of error of 3 percent, we arrived at a sample size of 751 SMEs for

the study; however, we conducted another 200 surveys to account for non-response. The final sample was 951 SMEs.

To ensure rich analysis of SME growth, we assessed the performance of SMEs that use the Internet and related applications, and the ones that do not, and then identified factors affecting growth, as well as the sectors and subsectors that have good potential to grow by using the Internet. We incorporated various growth parameters—change in number of employees and customers, and in profit and revenue over time—to overcome flaws associated with using a single measure of growth. We used statistical tests, such as parametric and nonparametric tests and frequency analysis, to gauge the performance of SMEs that use the Internet and related applications vis-à-vis SMEs that do not.[20] We then tested our hypotheses (Figure 3) using regression analysis[21] and quantified the impact of the Internet on the performance of SMEs.[22]

Figure 3
Hypotheses

1. Growth	• Growth = f (economic, Internet, demographic, business factors)
2. Internet Adoption	• Internet Adoption (yes/no) = f (economic, demographic, business factors)
3. Extent of Internet Use	• Extent of Internet Usage (either through applications and/or for business operations) = f(economic, demographic, business factors)
4.Sector Use of Internet	• Internet use= f(sector)
5.Subsector benefits from Internet	• Internet use= f(subsector)
6. Simultaneous Regression of Growth and Internet Usage	• Growth = f (Internet use) • Internet use = f (growth)

4. Findings

The Internet has a significantly positive impact on SMEs who use it—raising employment by 4 percent, number of customers by 7 percent, profits by 49 percent, and revenue by 51 percent—and those that use the Internet fare much better than those that do not.[23]

Among surveyed SMEs, about 85 percent were small enterprises and 10 percent were medium enterprises.[24] Fifty-two percent were in the manufacturing sector, 45 percent were in the service sector, and the remaining 3 percent were in the agriculture sector. Table 2 summarizes the demographic, business, and Internet use characteristics of the surveyed sample by sector.

Table 2

Summary Statistics

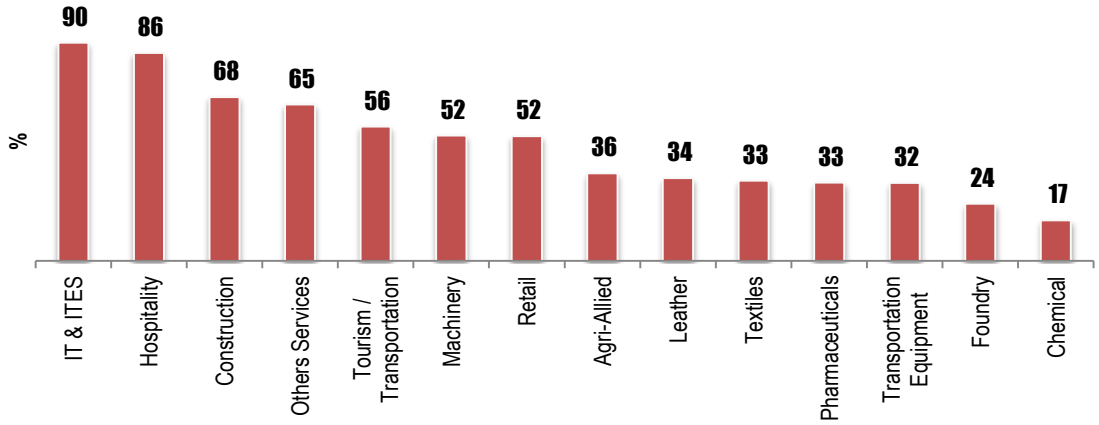
Parameter	Agriculture	Manufacturing	Service	All Sectors
Number of enterprises	52	477	422	951
DEMOGRAPHIC				
Average age of key personnel (years)	37	38	34	37
Average educational qualification of key personnel	Diploma/cert. course	Graduate/ Bachelor's	Graduate/ Bachelor's	Graduate/ Bachelor's
Enterprise's average ownership structure	Partnership	Partnership	Partnership	Partnership
BUSINESS				
Percent engaging in foreign trade	10	25	11	18
Average geographic reach	State level	State level	State level	State level
INTERNET				
Percent using computers and laptops	98	92	97	95
Percent using the Internet	64	85	87	85
Percent with a website	36	32	69	49
Percent engaging in e-commerce	15	19	37	27
Average Internet use in Gigabytes(GB)	12	10	16	13
Percentage of employees aware of the Internet	31	33	53	42
Percent using the Internet to find competitors' prices	31	48	67	55
Percent using social media	10	42	40	39
Percent using search engine optimization	19	15	31	22
Percent using the Internet to advertise	27	36	51	42

Use of Personal Computers. Ninety-five percent of SMEs surveyed used computers. This rate ranged from 74 percent in the foundry subsector to 100 percent in the information technology & enabled services (IT&ITES), other services,[25] tourism/transportation and transportation equipment subsectors.

Use of the Internet. Among SMEs that use the Internet, about 84 percent do so to get information on domestic market trends, 71 percent to find clients, and 55 percent to research competitors' prices. Only 27 percent use it for e-commerce and a mere 42 percent for advertising. Thirty-nine percent of Internet using surveyed SMEs use social media, a rate higher than found in a recent study in Australia (27 percent).[26] As expected, Internet use among SMEs in the IT&ITES subsector was 100 percent. The next highest percentage was in tourism/transportation (98 percent), followed by chemical products (96 percent), pharmaceuticals (95 percent), retail (70 percent), agri-allied (63 percent), and foundry (49 percent).

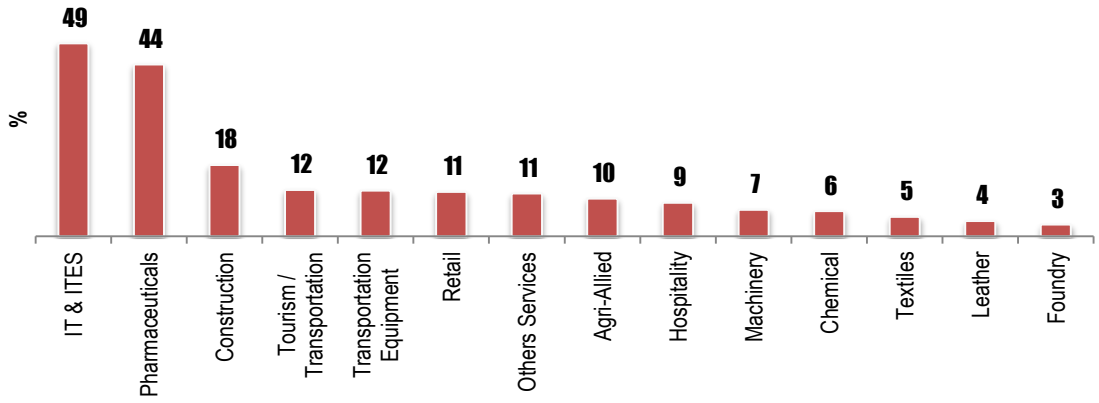
SMEs with Websites. Forty-nine percent of Internet using SMEs surveyed had websites; IT&ITES and hospitality had the highest numbers, and the chemical products and foundry subsectors had the lowest (Figure 4). In India, 93 percent of SMEs with websites used the Internet for email, compared with only 50 percent in China—even though the SMEs surveyed in both studies had websites at similar rates.[27]

Figure 4
SMEs Owning Websites, by Subsector



Monthly Use of the Internet. The IT&ITES and pharmaceuticals subsectors use the most Internet data, and foundry and leather products subsectors use the least (in gigabytes). See Figure 5.

Figure 5
Average Monthly Use of the Internet (in GB), by Subsector



Mobile Phones as Internet Connection. While wired connections are the most common source of the Internet used by all sectors, mobile phones are also used, primarily in by the textile products subsector.

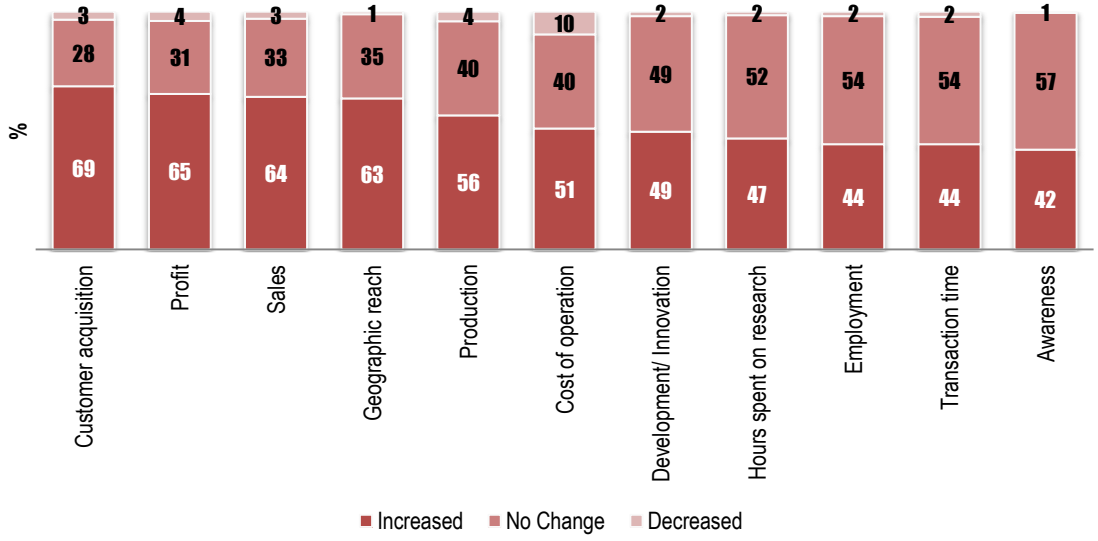
Connection Costs. WiFi costs the most to set up and on a monthly basis, followed by wired connections. Data cards are the cheapest to use, but allow for only limited use. See Table 3.

Table 3
Average Internet Set up Cost, Monthly Charges, and Average Use

Internet Connection Type	Set up Cost (INR)		Monthly Charges (INR)		Use (GB)	
	Average	Median	Average	Median	Average	Median
Wired	3,526	1,500	2,193	1,075	95.8	4.0
Data Card	2,764	1,799	1,707	995	7.3	3.0
WiFi	5,503	2,875	3,210	1,500	24.1	6.0
Others	282	199	216	180	2.2	2.2
Overall	**3,019**	**1,593**	**1,831**	**938**	**32.3**	**3.8**

The perceived benefits of using the Internet are significant: 69 percent of respondents reported an increase in customers due to Internet use, 65 percent an increase in profits, 64 percent an increase in sales, 63 percent in geographic reach, and 44 percent in employment.

Figure 6
Surveyed Respondents' Perceived Impact of Internet on Revenue, Profitability, Innovation, Costs, Coverage, Productivity, and Employment



In addition to the benefits expected for the IT&ITES subsector, SMEs in the chemical products subsector attribute an exceptional increase in customer acquisition, revenue, profit, and geographic reach to the Internet, which facilitates linkage with the upstream and downstream markets. The Internet's positive impact on sales and geographic reach is also well recognized in

the hospitality, textiles and textile articles, and tourism/transportation subsectors. Figure 6 above summarizes respondents' perception of the impact of their Internet use.

That SMEs using the Internet fare better in revenue, profit, and employment than those that do not is confirmed by statistical tests (Table 4) and regression analysis, which controls for other factors that could be influencing performance.

Table 4

Difference in the Performance of Internet-using versus Non-using SMEs

Performance Variables	Mean - Internet Connection		Median - Internet Connection		Nonparametric Tests		Parametric Test
	Yes	No	Yes	No	Median Comparison	Wilcoxon Two-Sample	Mean Comparison
Revenue in 2011-2012(in lakh INR)	123	46	35	15	***	***	***
Profit in 2011-2012(in lakh INR)	21	7	12	3	***	***	***
Number of customers in 2011-2012	219	213	75	75			
Number of employees in 2011-2012	40	24	18	12	***	***	*

Note: Levels of significance at 1% (***), 5% (**) and 10% (*) percent. Significance at any of these levels implies that the difference of variables (revenue, profit, customers or employment) between Internet using and non using firms is statistically significant. Blanks imply insignificant results.

Among surveyed SMEs who use the Internet, those in the service sector fared better than the others on all performance indicators. SMEs in manufacturing and services benefitted from e-commerce and Internet advertising, suggesting that these applications have inherent appeal to India's tech savvy youth who prefer fast and easy purchasing methods and showing how e-commerce shrinks the world and enables transactions that otherwise would not exist. This conforms with earlier studies that by offering platforms for SMEs to transact online, Internet-based firms like Google, E-bay, Amazon, Alibaba.com and Facebook help SMEs grow and expand internationally.[28]

Some subsectors are more aggressive in using the Internet and its applications than others. SMEs in the leather and leather products subsector, for example, are increasingly involved in foreign trade and use the Internet with maximum impact to advertise their products. About 32 percent of leather product SMEs surveyed are engaged in foreign trade, mostly exports. As expected, Internet use in the IT&ITES subsector also had a huge positive impact on performance. Other subsectors—such as tourism/transportation services, hospitality, chemical products, textile and textile articles, construction services and retail—have also benefitted. SMEs in the textiles and garments subsector in particular credit the Internet with expanding their market reach and demonstrate the promise of intensifying use of Internet in business operations.

Using the Internet to Diversify, Communicate, Innovate, and Market : Survey Case Studies

Mumbai-based Kusum Apparel distributes finished garments and food products like fruits, vegetables, and eggs. It has been advertising its new catering and decoration businesses on multi-utility online platforms like sulekha.com, and attributes the 70 percent increase in its catering and decoration sales to the Internet.

One Indian textile manufacturer of readymade garments for children and women uses the Internet to enter markets overseas. In business since 2000, the company has a manufacturing plant in Noida, Uttar Pradesh and another in Delhi. It exports to 12 countries, including the United States and the United Kingdom, and is importing machinery to build its embroidery expertise. The company uses digital cameras, e-mail, and computer-aided design to facilitate communication in domestic and foreign markets and bases its new textile designs and patterns on trend research conducted on the Internet. The company also uses online digital design libraries (eztextiles.com) to create new designs at a low cost. The company attributes 18 percent of the increase in sales and 25 percent of the increase in its customer base to the Internet and its applications.

Meanwhile, a shoe and leather accessory manufacturer in Uttar Pradesh has used the Internet to enter foreign markets and now has customers in 40 countries. The company uses Skype and email to communicate with customers, and search engine optimization and social media for inexpensive and effective marketing.

Note: These examples of Internet success are based on interviews and qualitative surveys.

Results of regression analysis fortify our findings.[29] The analysis was done using two assumptions. The first is that an SME's use of the Internet leads to growth. Under this assumption, we estimated the impact of Internet use intensity on revenue, profit, employment, employment growth and the number of customers.[30] Use intensity was defined by average monthly use in gigabytes, number of Internet-based applications run in an SME, number of business operations accomplished through the Internet, and number of years the Internet had been used at the SME. The second and perhaps more realistic assumption is that, fast growing SMEs are the ones that adopt the Internet and use it intensively. To account for this "reverse-causality" we modeled a system wherein profit or revenue was a function of economic, Internet, demographic, and business factors and simultaneously Internet use (defined by average monthly use in gigabytes) was a function of profit, revenue demographic, and business factors.[31]

After controlling for other factors—SME investment in plant and machinery; age, gender and education of key personnel; ownership type; state and subsector of operation; existence of website and employee awareness of Internet etc.—the analysis showed that

- The Internet can significantly affect business performance. An SME that uses on average 10 GB of Internet data per month experiences a revenue increase of 7 percent to 32 percent,[32] a profit increase of 8 percent to 43 percent, 13 percent higher employment, 22 percent higher employment growth, and 18 percent more customers than the SME using only 5 GB of Internet data per month.

- An SME using 20 Internet applications has 21 percent higher revenue, 16 percent higher employment, 31percent higher employment growth, and 32 percent more customers than an SME using only 10 applications.
- An SME using the Internet for 12 years has 21 percent higher revenue, 25 percent higher profit, 37 percent higher employment, 35 percent higher employment growth, and 9 percent customer growth *vis-à-vis* an SME that has been using the Internet for 6 years.
- Employee awareness is a significant influence on the extent of Internet use: doubling employee awareness increased Internet use by 28 percent.
- Internet use holds great promise for the textile and textile articles, leather and machinery and mechanical appliances subsectors.

Despite perceived and actual benefits, certain problems and concerns hinder Internet adoption and prevent SMEs that have adopted it from realizing its full potential.

Security Concerns. Sixty-one percent of Internet-using SMEs are very concerned about the security of online financial and personal transactions (e.g., hacking of email accounts). This concern might explain why e-commerce is not viewed as an important benefit of the Internet. Concerns are amplified by the ineffectiveness of the Information Technology Act 2000 in punishing cyber crime; offenders, for example, may be released on bail.[33] But even though 61 percent are concerned about security, only 34 percent are concerned about the risk of fraud. (Only 23 percent of surveyed SMEs engage in e-commerce; on average they have more revenue, employees, and customers than those that do not.)

Figure 7
Issues Facing SMEs

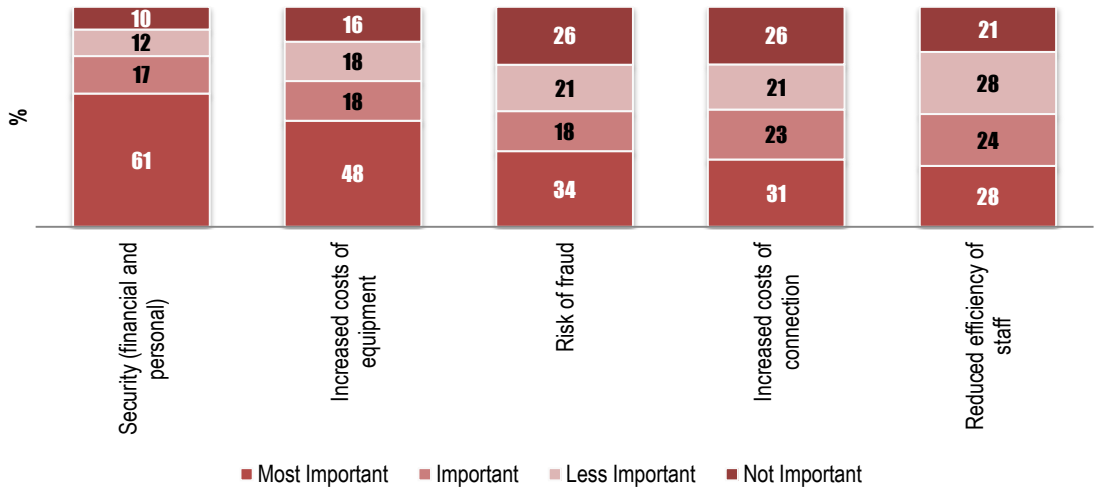
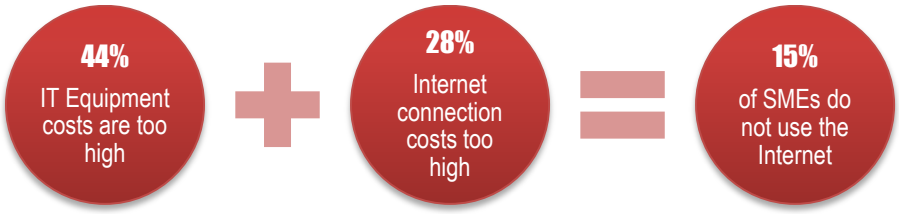


Figure 8
Effect of Costs of Equipment and Internet Connection on Internet Adoption



Connection and Equipment Costs. SMEs feel that the costs of Internet connections and IT equipment are high. Many are unable to use the technology efficiently because of its cost. About 44 percent of Internet-non using SMEs surveyed are very concerned about equipment costs, and another 28 percent cited increased connection costs as their top concern. In fact, high cost is the main reason that some SMEs do not use the Internet at all.

Perceived Rise in Operational Costs. Forty-seven percent of respondents cited reduction in the cost of operations as the top benefit of Internet use, but, contrary to expectations, costs declined only for about 10 percent and increased for 51 percent. Many in this 51 percent are in the transportation equipment subsector. The impact of Internet use on operational costs, however, may be indirect. SMEs in the subsector feel that competition has caused manufacturers to adopt new techniques of production compulsively, thereby causing a general rise in the costs of production. SMEs in the leather and leather products subsector also attribute reduced profits and sales to the Internet. This may be because increased international competition and the entry of new players has facilitated online sales, and this has reduced the revenue of indigenous SMEs in the leather goods subsector.

Maintenance Costs. Only 41 percent of SMEs surveyed have a website. Among those that once had one, the high cost of maintaining the site was the main reason for discontinuing it. Only a few SMEs in the leather, textiles, pharmaceuticals, transportation equipment, foundry, and chemical product subsectors had websites.

5. Recommendations

India has 150 million Internet users, behind only China and the United States. But its Internet penetration rate is a mere 10 percent—one of the lowest in the world. All businesses that use the Internet increase sales, profits, number of customers, and productivity, and small businesses stand to gain the most. So how can they be encouraged to do so?

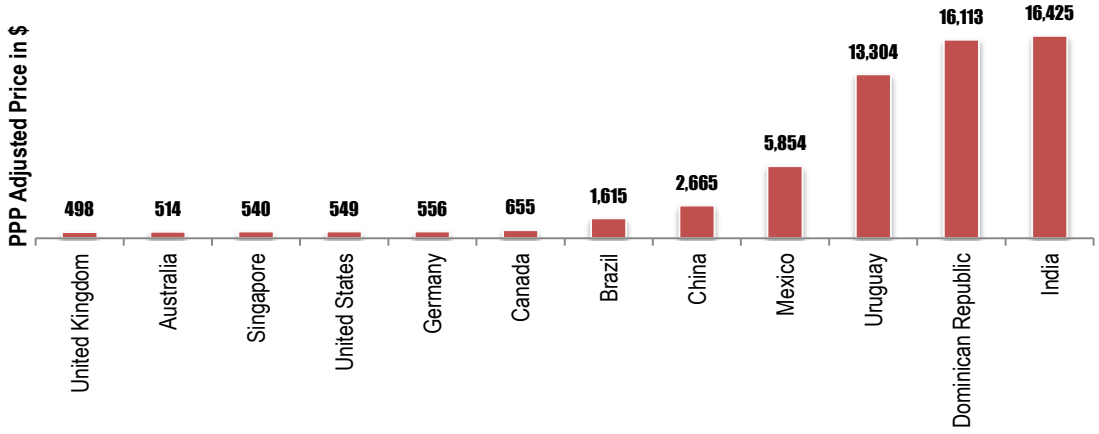
Despite the many obvious benefits of Internet use, SMEs report not using it or not using it to full potential because of security concerns and costs. The potential of the Internet for these firms is limited by problems rooted in weak infrastructure, regulation, and workforce awareness—all problems the government can do much to solve. With this in mind, we offer the following recommendations to facilitate Internet use among SMEs and unleash their potential.

1. Lower Costs of IT Equipment and Internet Connections

The high cost of IT equipment is a major constraint on SMEs using and wishing to use the Internet in India, erecting a barrier to entry where there should not be one. Computer hardware prices, for example, are higher in India than elsewhere. Out of 12 countries, India has the second highest actual price for a Dell Inspiron 14z Ultrabook, and the highest price after adjusting for purchasing power parity (PPP) (Figure 9). The actual price was US$829 in India, compared to a low of US$532 in Canada. In PPP terms, the difference is staggering: the laptop costs US$ PPP 16,425 in India compared to only US$ PPP 498 in the United Kingdom—32 times higher. The actual prices need to be reduced to a level similar to that in other countries. And instead of personal computers, SMEs could consider cheaper options, such as tablets with Internet access.

Figure 9

Price of a Dell Inspiron 14z Ultrabook in 12 Countries (purchasing power parity in US$)



SOURCES: *PPP: http://data.worldbank.org/indicator/PA.NUS.PPP/countries?display=default*
Laptop model and prices: http://www.dell.com/ as of June 5, 2013.

Internet connection costs in India are also very high. At US$ PPP 61, the median monthly cost of 1 Mbps of Internet in India is the highest of all countries studied in McKinsey's 2012 report, "Impact of Internet on the Indian Economy. " In the United States the cost is US$ PPP 5 and in China US$ 11PPP.

Costs are high because infrastructure is poor and competition among Internet service providers (ISP) is so weak as to be nonexistent. The top ISP, government-owned BSNL, claims more than 50 percent of the market. The top two have a market share of more than 75 percent and the top four have a combined market share of nearly 90 percent (Table 5). This indicates a highly concentrated market, as measured by the Herfindahl–Hirschman Index, and such concentration could be behind the high costs of service (Table 6). In contrast, in the United States, where Internet costs are much lower in US$PPP terms than in India, the top four ISPs for businesses have a combined market share of only 44 percent.[34]

Table 5
Market Share of Five Major ISPs, December 2012

ISP	Market Share (%)
BSNL	51.7
Reliance Commn. Infra. Ltd.	24.6
MTNL	7.7
Bharti Airtel Ltd.	5.5
Hathway Cable & Datacom Pvt.Ltd.	1.5

SOURCE: *Internet Service Providers Association of India*

Table 6
Herfindahl–Hirschman Index for ISPs in Various Countries

Country	HHI	Combined Market Share (%)	
		Top 2 ISPs	Top 4 ISPs
India	3,494	77	91
Australia	2,972	68	92
United Kingdom	1,988	49	85
United States	1,686	32	44

For connection prices in India to fall to levels in other countries, and to levels that SMEs can afford, infrastructure must be improved and competition in ISP provision and IT equipment market increased. A cross-country study by Nathan Associates, "Information Technology in the Economy of India," (2005) showed that increases in IT capital of an economy lead to increases in GDP and labor productivity.

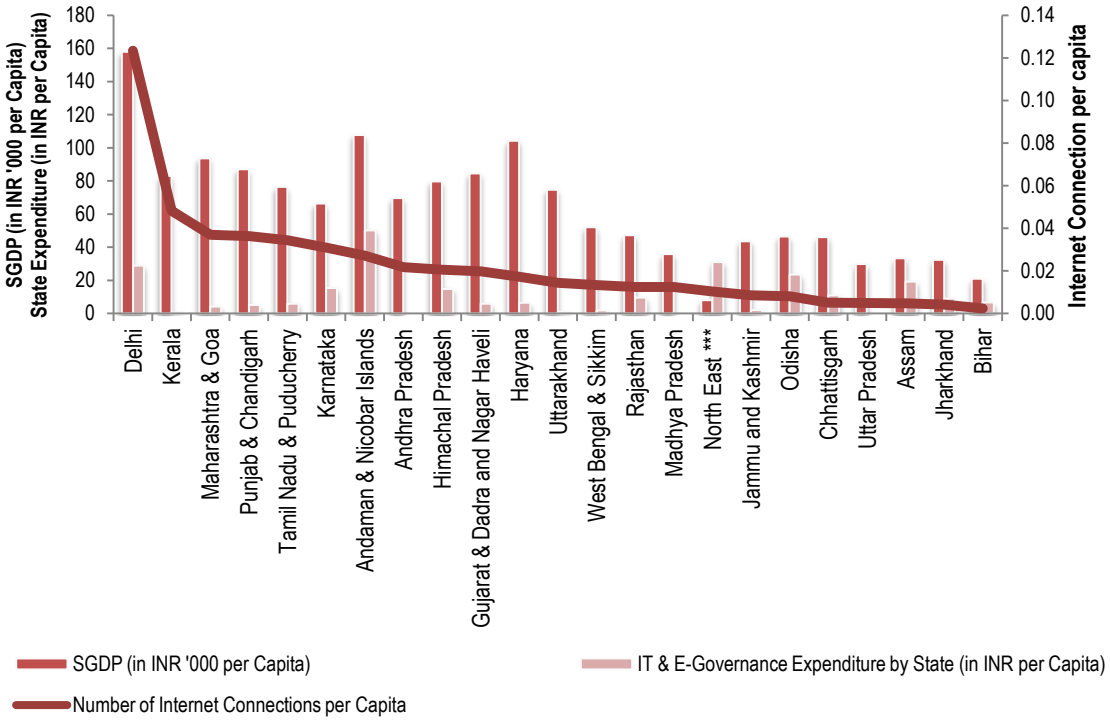
2. Improve Internet Infrastructure–Internet Speed and Power Reliability

States that improve Internet infrastructure spur Internet adoption by businesses. Our analysis focused on newly collected data, but other sources assessing the relationship between number of per capita Internet connections, state GDP and state expenditure on IT and e-governance show

that Internet penetration is higher in economically stronger states or states that spend more on IT per capita. Delhi had the highest Internet penetration for 2011-2012 (Figure 10).

Figure 10

Internet Penetration, State GDP, and State Expenditure on IT and E-Governance



SOURCES: SGDP Data for FY2010-11, Ministry of Statistics and Programme Implementation, Gov't of India. State Expenditure on IT & E-Governance for 2010-11, Planning Commission. Number of Internet Connections as of December 2011, India Stat.

Power cuts severely constrain Internet use. Chennai, which is a hub for India's automotive industry, endured two hours of scheduled power cuts per day and one full-day (8 hour) cut per month—in addition to unscheduled outages.[35] Rural areas, home to many SMEs, endure even longer power cuts. Large companies routinely purchase back-up generators, invertors, or data cards to use during outages. Fifteen percent of wired and wireless Internet users in our survey also use data cards, likely as a backup, but the cards are slow and their cost is piled on to the cost for regular wired and wireless access. If the Internet is to reach its full potential, especially for SMEs, electricity shortages must be resolved so power is provided reliably 24 hours per day.

Internet connections in India tend to be slow and below international standards. Most connections are less than or equal to 256 Kbps and 85 percent of subscribers still use DSL (Digital Subscriber Line), not the cable and fiber optic options common in other countries.[36] A full 6 percent of SMEs surveyed have no access to an Internet connection. In hilly regions, such as the Northeastern states, network coverage is so poor that even data cards do not work properly. IT infrastructure must be improved so all businesses—big and small—can realize the benefits of the Internet. Fiber optic cables, for example, must be built to modernize the Internet and reach more of the population. Under an INR20,000 Cr. (US$3 billion)[37] project, the Government of India is creating a national network that will connect all 2,50,000 Gram Panchayats with optical fiber cable. The project is expected to be completed by 2014.[38] If successful, it will greatly enhance IT infrastructure, especially in rural areas.

3. Create a Secure Environment for E-Commerce

E-commerce can help SMEs expand their customer and geographic base and increase sales significantly. SMEs' concern about the security of online financial and personal transactions could be dampening engagement in e-commerce in India, but SMEs are not as concerned about fraud, which suggests that other factors are in play. E-commerce, for example, requires smoothly functioning supply chains, with ready access to sources of primary goods, reliable infrastructure for transporting goods, and efficient postal delivery—all of which India lacks. To cope with India's 22 languages, e-commerce applications must have translation capability. And online transactions require payment by credit card and other forms of credit, a major obstacle in India where such credit access is limited.[39]

In the short-term, online retailers should consider using a courier and cash-on-delivery system or third-party (escrow) accounts into which customers transfer money once they are satisfied with the purchase, like China's Alibaba. In the long-term, making e-commerce feasible, reliable, and secure in India, especially for SMEs, requires improving supply chains, e-commerce translation capabilities, improving access to credit and online payment methods, strengthening cyber crime laws, and punishing cyber crime offenders.

4. Raise Awareness of the Internet and Develop Related Skills

Two-thirds of SMEs surveyed without an Internet connection have a computer. Seventy-seven percent of these non-users simply don't see the benefit of the Internet. And few SMEs have websites despite the obvious benefits for marketing, advertising, e-commerce, customer and vendor feedback, and employee recruitment—not to mention positive effects on sales, profits, and number of customers. On average only 43 percent of employees in an SME are aware of Internet use.

FICCI's 2012 survey of 150 SMEs, "Use of ICT tools by Indian SMEs and its impact on their business," had similar findings: 95 percent of surveyed firms benefitted by using ICT for marketing, market research, and financial operations but confined Internet use email and social media. Lack of technical knowhow and costs prevented firms from using advanced ICT tools for such functions as resource planning.

ALIBABA: "The crocodile of the Yangzi."

China's Alibaba is the largest e-commerce company in the world. In the financial year ending September 2012, its two portals had sales of US$170 billion, more than eBay and Amazon combined. The company was started in 1999 as an online listing service connecting small manufacturers to prospective clients in China and overseas through email. It has since expanded from its business-to-business model to a business-to-consumer and consumer-to-consumer (C-2-C) model. Its C-2-C operation, Taobao, features 1 billion products, is among the 20 most-visited sites in the world, and has a business model similar to eBay's. Alibaba now lists 6 million vendors, delivers 60 percent of China's parcels, and employs 24,000 people. Its initial public offering is expected to be valued between US$55 billion to US$120 billion. Alibaba is planning to expand into Africa, Asia, and Latin America. The popularity of Alibaba is due in part to its payment system, Alipay, an escrow account into which sellers transfer payment once they are satisfied with their purchase.

SOURCE: *The Alibaba phenomenon,* The Economist*, March 23, 2013 (http://www.economist.com/news/leaders/21573981-chinas-e-commerce-giant-could-generate-enormous-wealthprovided-countrys-rulers-leave-it)*

To make SMEs aware of the benefits of the Internet, the government should invest more in education and the development of technical skills. Its current programs include the Marketing Assistance Scheme of NSIC, the National Manufacturing Competitiveness Program, and Rajiv Gandhi Udyami Mitra Yojana. The government could organize training events on a regular basis and publicize them through multiple media; introduce courses in basic computer skills and the Internet into the school curriculum; and make training material on Internet use available to the self-employed and micro and small enterprises. These include, for example, housewives who currently rely on "word of mouth" to advertise their catering, jewelry-making, or sewing businesses. The private sector can also do its part. Sponsored by the Industrial Development Bank of India, Industrial Financial Corporation of India, ICICI Bank, and State Bank of India, the Entrepreneurship Development Institute of India is a good first step in this direction.

5. Support a Growth-enabling Environment

India has the right ingredients needed to profit from a boom in SME use of the Internet including the technical skills, manpower, and entrepreneurs. What is needed is an environment that encourages that use. To ensure the Internet continues to contribute to India's economic growth, the government must take steps to keep the Internet ecosystem innovative, user-driven, and competitive. Online markets are nascent in India, so nurturing that ecosystem must be a priority goal of policy. Regulation, for example, should not erect false barriers of entry or impede competition in a sector that is otherwise free of such barriers. Instead, policies that encourage the growth of micro, small, and medium-sized enterprises are needed. Here, the landmark is the Union Budget 2013, which provides that enterprises entering the next stage of growth (e.g., from micro to small, from small to medium) can retain the benefits and support they started with for up to three years. It also provides a larger pool of credit for these companies. More such policies are needed to support the growth of small businesses in India.

6. Share Success Stories and Encourage Registration

To raise awareness of the power of the Internet, government and industry associations can organize seminars, workshops, and roundtables during which representatives of successful firms describe how they use the Internet to grow. Such events can also be an occasion to encourage SMEs to register with the Ministry of MSMEs. Only 12 percent of SMEs in India are registered; the rest are missing out on the benefits that come with registration.

Conclusion

The benefits of the Internet for all businesses are clear—increased sales, profits, number of customers, and productivity. In enabling broad geographic reach and inexpensive advertising, the Internet is especially promising for SMEs. We have shown the impact of the Internet on SME performance, explained why small firms in India are not using the Internet or not using it to it to the fullest extent possible, and recommended ways to change this. Equipped with this knowledge, policymakers can see the potential being untapped by underuse of the Internet and take steps to unleash that potential for the benefit of SMEs and India's economy.

Appendix. Regression Analysis

Table A-1 describes the variables used in our regression analysis and presents the regression equations used in the analysis.

Table A-1

Description of Variables used in Regression Analysis

No.	Variable	Definition
1	Performance factors	Annual revenues of the enterprise (2011-12); (Lakhs INR)
		Annual profits of the enterprise (2011-12); (Lakhs INR)
		Number of employees in the enterprise (2011-12);
		Number of customers of the enterprise (2011-12);
		Employment growth of the enterprise (from 2009 to 2011); (Percentage)
2	Index of Internet Use	The index takes a value from 0 to 21 for an enterprise;
		It is based on use of Internet to run 5 applications (e-mail, intranet, audio/video conferencing, remote access, and any other application) and accomplish 16 business operations (e.g., e-commerce, e-banking, e-governance, social media, advertising, hiring, and obtaining information on competitors' prices and products, market trends, potential clients and vendors, new products, research, technical matters, and undertaking foreign trade).
		The index assigns a value 0 for SMEs not using Internet for any function and assigns a value 1 for each application/function performed using Internet. The values are them summed to get the value of the index. For, example if only email is used, the index takes a value 1. If e-banking and email are both used it takes a value 2 and so on.
3	Internet factors	Internet adoption: whether the Internet has been adopted
		Average monthly use of the Internet (in Gigabyte) measured across all sources of Internet - data card, WiFi, wired Internet connection or mobile phone
		Number of years since which Internet has been used in the enterprise
		Existence of a website
		Use of website for e-commerce
		Use of a server in the enterprise
		Number of employees aware of Internet use
4	Economic factors	Investment in plant and machinery; (Lakhs INR)
5	Demographic factors	Age and gender of the key personnel
		Educational qualifications of the key personnel - postgraduate and above, graduate, diploma/certificate course, higher secondary, secondary, middle school, primary school, illiterate
		Location– urban, semi urban, rural
		Ownership type – individual proprietorship, partnership, private limited, public limited, branch of a foreign company or cooperative
6	Business factors	Enterprise subsector
		State of incorporation of the enterprise
		Geographic reach– village, district, city, state, national or international
		Involvement in foreign trade

MODEL SPECIFICATIONS

Impact of Internet on SMEs

1. Log (revenue)= f (log investment, log age of key personnel, dummies for (using internet, subsector, gender, educational qualifications, ownership type, location))

2. Log (profit)= f (log investment, log age of key personnel, dummies for (using internet, subsector, gender, educational qualifications, ownership type, location))

3. Log (employment)= f (log investment, log age of key personnel, dummies for (using internet, subsector, gender, educational qualifications, ownership type, location))

4. Log (number of customers)= f (log investment, log age of key personnel, dummies for (using internet, subsector, gender, educational qualifications, ownership type, location))

Factors Affecting Growth of SMEs [Ordinary Least Squares Regression]

1. Log (revenue)= f (internet variable, log investment, log age of key personnel, dummies for (website, subsector, gender, educational qualifications, ownership type, location)) where, internet variable in Model A = index of internet use; Model B = average use (GB); Model C = number of years of internet use

2. Log (profit)= f (internet variable, log investment, log age of key personnel, dummies for (website, server, subsector, gender, educational qualifications, ownership type, location)) where, internet variable in Model A = index of internet use; Model B = average use (GB); Model C = number of years of internet use

3. Log(employment)= f (internet variable, log investment, log age of key personnel, dummies for (website, server, subsector, gender, educational qualifications, ownership type, location)) where, internet variable in Model A = index of internet use; Model B = average use (GB); Model C = number of years of internet use

4. Log(employment change $_{2009\text{-}2011}$)= f (internet variable, log investment, Log age of key personnel, dummies for (website, server, subsector, gender, educational qualifications, ownership type, location)) where, internet variable in Model A = index of internet use; Model B = average use (GB); Model C = number of years of internet use

5. Log (number of customers)= f (internet variable, log investment, log age of key personnel, dummies for (website, server, subsector, gender, educational qualifications, ownership type, location)) where, internet variable in Model A=log index internet use; Model B =log average use (GB); Model C=log number of years of internet use, Model D= website used for e-commerce (yes=1, no-0)]

Factors Affecting Adoption of Internet in SMEs [Probit Regression]

1. Internet adoption (yes/ no) = f (revenue, investment, age of key personnel, dummies for (subsector, state, gender, educational qualifications, ownership type, location, geographic reach))

Factors Influencing Increased Use of Internet in SMEs [Ordinary Least Squares Regression]

1. Log(index internet use)=f (log revenue, log investment, log age of key personnel, log number of employees aware of internet use, dummies for (website, subsector, state, gender, educational qualifications, ownership type, location, foreign trade, server))

2. Log(index internet use)=f (dummies for manufacturing sector, services sector, agriculture sector)

3. Log (index internet use) = f (dummies for chemical products, construction, foundry, hospitality (hotel / restaurant), IT & ITES, leather and leather products, machinery and mechanical appliances, pharmaceuticals, retail, textiles and textile articles, tourism / transportation, transportation equipment)

Reverse-causality Between Internet Use and Growth [Simultaneous Equation Model]

1. Log revenue= f (log investment, log average use (GB), age of key personnel dummies for (website, subsector, state, gender, educational qualifications, ownership type, location, foreign trade)); and,

   Log internet use in GB =f(log revenue, log number of employees aware of internet use, log age of key personnel,. dummies for (subsector, state, gender, educational qualifications, ownership type, location, foreign trade, server))

2. Log profit= f (log investment, log average use (GB), log age of key personnel dummies for (website, subsector, state, gender, educational qualifications, ownership type, location, foreign trade)); and,

   Log internet use in GB =f(log profit, log number of employees aware of internet use, log age of key personnel,. dummies for (subsector, state, gender, educational qualifications, ownership type, location, foreign trade, server))

ENDNOTES

[1] Data as of 2010-11. Source: Employment estimates from Annual Report, Ministry of Micro, Small and Medium Enterprises. Business Standard (November 25, 2011). SMEs to contribute 22% to GDP by 2020: Govt. http://www.business-standard.com/article/companies/smes-to-contribute-22-to-gdp-by-2020-govt-111112500165_1.html

[2] Jessica Wade, Background Note on the Micro, Small and Medium Enterprise Development Act 2006, IFMR (http://www.ifmr.ac.in/sefc/publications/Micro-Small-and-Medium-Entreprises-Development-Act.pdf)

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[14] Lal, K., & Peedoly, A. S., Small Islands, New Technologies and Globalization: A Case of ICT adoption by SMEs in Mauritius. Working Paper Series, United Nations University, Maastricht Economic and Social Research and Training Centre on Innovation and Technology (http://www.merit.unu.edu/publications/wppdf/2006/wp2006-005.pdf)

[15] Nathan India subcontracted Nielsen India (Nielsen) to commission the survey for collection of the primary data. Nielsen is one of the largest multidisciplinary research outfits in India. It offers services in development, market, and social system research as well as B2B, industrial, and project consultancy services. Nielsen has experience in an array of empirical research using modern analytical quantitative techniques.

[16] UNIDO, a UN agency, promotes industrial development to reduce poverty and encourage globalization and environmental sustainability. It has a list of SME clusters in 21 states of India targeted for development.

[17] The Director General Foreign Trade, an agency in India's Ministry of Commerce and Industry, is responsible for foreign trade policy and export promotion.

[18] The geographic and industrial cluster list is in Appendix D of the full report.

[19] A representative sample could not be collected in this case because there is no sampling plan covering all SMEs in India and the industrial clusters are concentrated in certain places.

[20] Nonparametric tests are not based on assumptions of the distribution of the underlying population. Example, difference in median test using two sample t-test, Wilcoxon-Mann-Whitney test.

[21] Regression analysis is "concerned with the study of the dependence of one variable (the dependent variable) on one or more other variables, the independent or explanatory variables." It helps quantify the relationship between the variable of interest (the dependent variable) and other independent explanatory variables that are chosen a priori based on economic theory.

[22] The analysis was done using SAS and STATA packages.

[23] Proven using regression analysis, controlling for other factors that might be influencing performance.

[24] The remaining companies reported levels higher than the SME thresholds during their survey.

[25] Including financial, telecommunication, education, social service, real estate, knowledge process outsourcing companies, and business process outsourcing companies.

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[28] Lisbon Council, 2011.

[29] Our regression framework and variables are described in an appendix of the full report.

[30] This was done using Ordinary Least Squares Regression.

[31] This analysis was done using a simultaneous equation model (SEM). In an SEM, there is a two-way relationship between Y and X, which makes the distinction between dependent and explanatory variables of the regression analysis of dubious value. It is better to lump together a set of variables that can be determined simultaneously by the remaining set of variables. See *Basic Econometrics* by N. Gujarati Damodar.

[32] Lower element of the range derived from the Ordinary Least Squares Regression using assumption (1) and higher element derived from the Simultaneous Equation Model using assumption (2).

[33] As per section 43(a) of the IT Act, offence punishable with imprisonment for three years is bailable. Source: The Information Technology (Amendment Bill) 2008. http://bsu.bih.nic.in/(S(ff3tcebmkoyb1h55i1x3v145))/static/downloads/itact/it-amedment-act-2008.pdf

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[35] In the summer of 2013.

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