CORPORATE GROWTH THROUGH ACQUIREMENT: WHETHER SUSTAINABLE?

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ABSTRACT

In contemporary worldwide situation, Mergers and Acquisitions (M&A) has become a typical technique for corporate to develop. At the point when organization needs quick development, this strategy may be perhaps the best alternative for them, since it (M&A) gives the moment result. In countless events M&A has substantiated itself as a genuine way to develop, and to make the ideal progress. M&A makes the extent of development for the organization which causes it in making investors' wealth, to go into the new market just as to extend in existing business sector and to improve the money related outcomes.

M&A may empower organizations to appreciate various advantages like, getting talented and quality staff, getting to in worldwide market, catches undiscovered local market, lessen risk from contenders, increment income and some more. This paper looks at the effect of M&As, in Indian situation, on their financial exhibition considering pre and post-merger situation, and furthermore analyzes whether such execution be taken as supportable. A few noteworthy exhibition (money related) financial ratios of the organizations, their market size, development and profitability have been evaluated to fill the need.

Keywords: Mergers and Acquirement, Corporate Growth, Performance Ratio, Sustainability

INTRODUCTION

To be successful and consistent in business, corporate development is important and a requirement for business firm. M&As are considered as one of the popular

corporate strategies for achieving faster and unwavering growth. M&A is also accepted as a means that companies adopt to accomplish the benefit of best managerial expertise, bigger market share in a competitive environment, increase profitableness, hold market leadership, increase their capital base and so many. It is an external outgrowth strategy that has become now-a-days a popular phenomenon in several countries around the globe probably causing from increased pressure through denationalization, deregulation, globalization, intensive competition, economic disappointment etc.

The common motives behind M&As for the corporate are to achieve desire growth and sustain profitableness. M&As are considered as one of the most popular avenue of corporate restructuring or business combination which might play a pivotal role in the external growth of companies. According to Thomson Reuters M&As deals reached on a pick in 2006 grasping $4 trillion globally. However, it slowed down worldwide in 2007-08 largely due to global financial crisis and down act of the security market around the world. According to the Grant Thornton Report, Global M&As activity again recovered in 2010, with a 3.8% increase in the number of announced transactions.

Even though M&As are planned sensibly there might have some integration problem between the acquirer and the target and this may be due to their conflicting soul objectives, different attitude and culture of the acquirer and the target, clients attitude toward the merged or acquired company and so on. According to Harding & Rouse "The success of most acquisitions hinges not on dollars but on people". (Harvard Business Review, 2007).

Under the above background, the focus of this paper is to examine whether M&As of the Indian corporate are mostly successful and how much it serves for sustainable growth for them.

REVIEW OF LITERATURE

Ample studies have been conducted on M & As from time to time throughout the globe. Brief follow-up of some of such important studies in India and abroad are given below:

Kiymaz and Kilic (2004) examined the cross border M&As and its impact on the stock price behaviour of target and acquirer companies. The researchers analysed stock price behaviour around event day by applying the jump diffusion model and then compared result of the model with the pure diffusion model to measure the performance of firms. The authors found that the jump diffusion model was better for measure the wealth effects of M&A on foreign targets and bidder. Even in case of multiple announcements of mergers the authors found that the jump diffusion model had been consistent and was better appropriate than the diffusion model, especially when there had been information leakage.

Lin and Chen (2006) investigated job performance of employee affected from mergers from the view point of business moral principles. The researchers focused on employee related ethics which helped in merger and acquisition a success. The authors considered employment security, justice, and caring practices by employer that driven the employees towards their ethical behaviour. The authors found job performance of the employees and the acceptance of new environment created by M&A was bestowed upon their commitment towards their mother organization, which also enhanced their ethical behaviour towards the organization.

Bertoncelj and Kovac (2007) inspected the key element of success (hard and soft) of M&As. The authors considered five basic components, namely, growth, resourcefulness, optimization, economic value and stakeholders' value for judging the success of M&As. Among soft factors learning, management team, intelligence, managerial traditions, communication, and in hard factor acquisition search, diligence, financial resourcefulness, added value potentials (synergies) and post-acquisition integration plan had been considered. The authors found that tough success factors were more sensitive to elastic success aspect for M&As to be successful.

Mantravadi and Reddy (2007) searched on the success of Indian firms due to involving towards M&As. main direction in the subject area was firm-size. Acquirers' performance ratios indicated size of the absorbing firms had impacted considerably on their operating consequences. Rakshit and Chatterjee (2008) studied how companies restructure their business through M&As. The authors also examined whether this strategy of corporate restructuring had positive or not. The authors considered a period of 10 years from 1995-96 to 2004-05.The authors considered ICICI Bank Ltd in order to conduct the research. To measure the performance and effectiveness of bank the authors applied EVA. The authors did SWOT analysis to provide the logic of this strategy of corporate restructuring. The authors found that ICICI Bank not gain that much profit immediately after the merger. Due to improper asset management the company face some loss in the in the years 2001-02 and 2002-03. Lastly, the authors could not draw a clear conclusion regard to corporate restructuring.

Kale (2009) studied the increasing trend of overseas acquisitions by the Indian firms. The author found that the reasons were in many fold. It helped the firms to have an access in the global market more easily in a quicker pace, it enhanced the technological efficiency of the acquirer and achieved skilful and talented employees of international focus. These achievements helped the Indian firms to face the global threat of competition and to create shareholders' value. Egle and Rima (2009) analysed the reasons for involvement in M&As. The writers considered growth and expansion as primary and synergy, access to intangible assets, diversification etc as secondary motives for M &As. They concluded that restructuring the capital was the prime reason for M & As.

Mishra and Chandra (2010) made a research on results of M&As on financial performance of Indian pharmaceutical companies based on 52 selected firms from the industry. Variables like Firm Size, Market Size, and intensity of Export and Import, sales, R&D expenses, advance technology had been examined as significant factors of mergers. The study documented that firm size, export and inland selling efforts had acted favourably on firm profitability.From the empirical results the authors found that firms those had larger market share suffered from lower profitableness in long run, which clash with general perception.

Sieage and Simons (2010) examined the effects of M&A on firm performance, productivity, as well as on the compensation and career development of workers. The writers evaluated the impact of M&As on the firm- performance considering the changes in short-run stock prices (through event study), long-run stock prices as well as accounting net profit. The paper found that plant productivity was raised more in partial acquisitions as compared to full acquisitions. Regarding firm performance the writers found that profit gain through M&A had not sufficient as expected. Other ways, the writers documented that mergers had upbeat on the career of workers.

Leepsa and Mishra (2012) investigated Financial Performance of Indian manufacturer in merged period. Event Study methodology had imposed for assessing the acquiring performance. Paired-t test was adopted to inspect the changes in economic performance due to M&As. The authors considered 3 prior and post years in the window. Paired-t test outcomes documented that earning of the companies had some incrementing trend when measured by ROCE and decreasing trend when measured by RONW in merged period. In a paper Popovici and Turliuc (2014) examined the efficiency of European banks in post-merger period. They found that due to M&As the total productivity of banks increased around 2.5% for positive change in technological efficiency. The authors argued that M&As remained beneficial to the banking sector and thus mergers served in a positive way to fulfil the purpose of banks to grow and to earn more profit.

Cherkasova and Zakharova (2016) examined the problems of suboptimal investment decision (under or over investment) involved in the process of acquisitions of targets. The researchers studied not only the level of investment in target companies but also examined whether investment decision in this regard had been changed resulted from such takeover. The researchers found that there involved suboptimal investment problem (underinvestment or overinvestment) in 74 out of 145 sample cases. Fuad and Sinha (2018) searched entry time and success of early movers' in merger-waves. With simulation analysis, the waves in 8 industry houses over 2000-2014 were observed. Tobin's regression was applied to study entry-timing within M&As waves and impact of entry-timing was measured on financial outcomes. Business groups belonging firms doing international business were found as early movers in the wave. The research found entry advantage in terms of performance was reaped by the early movers.

STUDY OBJECTIVES

1. To evaluate the financial functioning of firm during pre- and post- acquisition stages.
2. To examine whether the performance has enhanced in post-acquired time.
3. To search if size of acquiring companies has any impact on performance.

HYPOTHESIS

Null Hypothesis

H01: Financial functioning of firm during post- acquisition stages has not enhanced
H02: Size of acquiring companies does not have impact on performance in post-acquired time.

Alternatives hypothesis

HA1: Financial functioning of firm during post- acquisition stages has significantly enhanced
HA2: Size of acquiring companies has significant impact performance in post-acquired time.

DATA AND METHODOLOGY

The study is based on the secondary data of manufacturing companies in India that involved in M&As. The data are collected from Capitaline data base package provided by Capital Market Publisher India Ltd. Data also being collected from the websites of respective companies. For conducting the study we have taken a sample of 60 companies out of 426 listed manufacturing companies engaged in M&As during the period 2005-2012 and considered 5 years in pre-merger period and 5 years in post-merger for assessment purpose.

Here, our actual study period is confined to 2002-2017. A systematic sampling procedure has been followed dividing companies engaged in M&As into four quartiles on the basis of their asset size and after that top 15 companies from each quartile is represented for better reflexion. In order to assess the merger performance we have considered financial ratios such as return on capital employed, return on net worth, earning per share, as well as other parameters for example sales growth, total debt etc. We have made descriptive analyses on different financial parameters in pre- and post- merger period on the total sample, on large mergers and on medium and small mergers. Applying paired- t test we have examined whether there is any major upswing in performance of acquiring companies in post-merged time.

ANALYSIS AND FINDINGS

The study compares pre- and post-merger performance of a sample of 60 amalgamating companies. We have computed average values of different financial parameters and their fluctuations (SD) for five years before and five year after merger (excluding the year of merger) which are shown in the following table.

Table - 1: Mean and S. D. of Profitability of the acquiring firms in pre-and post- merger period

		Mean		Standard Deviation	
		Pre-merger	**Post-merger**	**Pre-merger**	**Post-merger**
EPS	Full Sample	6.265	14.047	9.213	15.212
	Large Acquirer	7.756	21.799	9.151	21.283
	Small Acquirer	4.773	6.294	9.275	9.140
RONW	Full Sample	12.976	13.965	10.896	16.031
	Large Acquirer	12.703	16.672	11.157	12.245
	Small Acquirer	13.248	11.257	10.635	19.816
ROCE	Full Sample	14.285	15.817	10.227	14.659
	Large Acquirer	14.916	17.571	10.280	12.137
	Small Acquirer	13.654	14.062	10.173	17.181
INT-COV	Full Sample	13.102	14.135	35.454	30.567
	Large Acquirer	13.543	16.474	43.077	28.642
	Small Acquirer	12.661	11.796	27.830	32.491

Authors' computation; Data source: Capitaline Database.

Table- 1 shows that mean EPS of companies has been increased to 14.047 in post-amalgamating period in comparison to 6.265 in pre- amalgamating period. Thus, there has a considerable increase in EPS of companies in post- amalgamating period. However, the fluctuation of EPS in post- merger period has also been increased which shows higher inconsistencies in EPS of the companies in post-merger period. The observation for full sample as well as for large acquirer regarding EPS change does not match with the observation for small acquirer. For small acquirer the EPS of the companies is more stable in post-merger period compared to the pre- merger period.

On the other hand though RONW and ROCE of companies have been increased in post- merger period, the magnitudes of increase are not that much. RONW for the small acquirers has been decreased in post- merger period (13.248 to 11.257). The data also exhibit considerable increase in the inconsistency of the parameters in the post- merger period. Change in interest coverage ratio in post- merger period is more or less in the same line of RONW and ROCE except it is less fluctuating in post-merger period. Next, we have compared the average changes in the performance parameter *viz*. EPS, RONW, ROCE and Interest Coverage in post-amalgamation period with their pre- amalgamation counterparts and tested whether the improvements in performance parameters in post- amalgamation period are statistically significant. For this purpose we have applied paired- t test

and the results are depicted in Table- 2 below:

Table - 2: Results of Paired - t test

Parameters		Paired Diff.		Comp. value and Sig.		
		Mean	Std. Error Mean	t-value	df	Sig. (2-tailed)
EPS: Post - Pre	Full Sample	6.90	2.171	3.178**	59	.002
EPS: Post - Pre	Large Acquirer	12.269	3.860	3.179**	29	0.004
EPS: Post - Pre	Small Acquirer	1.537	1.519	1.011	29	0.320
RONW: Post- Pre	Full Sample	-.751	1.892	-.397	59	.693
RONW: Post- Pre	Large Acquirer	3.422	2.509	1.364	29	0.183
RONW: Post- Pre	Small Acquirer	-1.919	2.790	-0.688	29	0.497
ROCE: Post- Pre	Full Sample	1.478	1.614	-.916	59	.364
ROCE: Post- Pre	Large Acquirer	2.598	2.359	1.101	29	0.280
ROCE: Post- Pre	Small Acquirer	0.358	2.226	0.161	29	0.873
INT-COV: Post - Pre	Full Sample	0.819	7.049	0.143	29	0.887
INT-COV: Post - Pre	Large Acquirer	2.296	9.157	0.251	29	0.804
INT-COV: Post - Pre	Small Acquirer	-0.657	7.049	-0.093	29	0.926

**Significant at 1 level.
Authors' computation using SPSS 23.0

The paired- t test results show that EPS has significantly improved in post- merger period at 1% level for full sample as well as for the large acquirer. However the improvement of EPS for small acquirer is not statistically significant. Though there are improvements in RONW and ROCE in post- merger period, such improvements are not statistically significant. Additionally, the increase and decrease in interest coverage ratio for both large acquirers and small acquirers are not statistically significant.

Observing Table 1 and Table 2 we can say that in most cases though there is an increase in earnings of the acquiring companies in post- merger period, the increase is proportionate to the increase in capital employed or net worth. For this reason we are unable to find any significant change (increase or decrease) in average RONW or ROCE in post merger period. Ratio of earnings to interest liability is also found to be proportionate leading to insignificant change in interest coverage ratio in post-merger period. However, in case of large acquirer as we find significant increase in EPS in post- merger period, the result indicates that the large acquirers might have better liquidity strength that enabling them of acquiring the target by settling their

claims by cash and not by increasing the equity base and that is not similar for small acquirer.

Sales Growth

Like earlier, we have computed averages of sales growth of the selected companies of year on year basis in pre- and post-merger period and computed their standard deviations, and shown in Table 3.

Table-3: Mean and S. D. of Sales Growth of acquiring firms in pre and post -merger period

		Mean		Standard Deviation	
		Pre-merger	**Post-merger**	**Pre-merger**	**Post-merger**
Sales Growth	Full Sample	-0.033	0.046	0.274	0.210
	Large Acquirer	-0.027	0.017	0.262	0.169
	Small Acquirer	-0.039	0.082	0.285	0.250

Authors' computation; Data source: Capitaline Database.

Results in Table 3 shows that the average sales growth in pre-merger period was negative and this negative growth has changed to positive growth in post- merger period. The sales growth in post-merger period has increased by 7.75% compared to the pre-merger period. The fluctuation in sales growth in year on year basis is also low in post-merger period compared to the pre-merger period. Thus, we can say that merger has good effect on the corporate as regards to the market share and its growth.

Next, we have applied paired- t test for testing whether the improvement in sales growth in post-merger period is statistically significant or not.

Table - 4: Results of Paired - t test

		Paired Differences		Comp. value and Sig.		
		Mean	Std. Error Mean	t	df	Sig. (2-tailed)
Sales Gr: Post - Pre	Full Sample	0.079	0.034	2.287**	54	0.026
Sales Gr: Post - Pre	Large Acquirer	0.045	0.036	1.247	29	0.222
Sales Gr: Post - Pre	Small Acquirer	0.109	0.059	1.922*	24	0.067

**Significant at 5% level, * significant at 10% level.
Authors' computation using SPSS 23.0
Note: in case of small acquirers, sales growths of 5 companies are excluded for data inconsistency.

The result of paired t rest documents that the improvement in sales growth in post-merger period is statistically significant at 5% level for full sample. The sales growth in case of large acquirer in post-merger period is found to be statistically insignificant. However, there has been a significant improvement (at 10% level) in sales growth of small acquirer in post-merger period.

From the observation of Table 3 and Table 4 we can say that the possibility of hostile merger in case of large acquirer is more and the mergers might be unfriendly. Moreover, for large acquires their domestic market may be saturated and this might be the possible reason of their incapability to make significant positive growth in sales in post- merger period.

But for the small acquirer the acquisitions are more need based and friendly. For the small acquirers market opportunity existed which they gripped better through such mergers and hence, the result documented significant increase in sales growth for small acquirer.

Debt Changes

Sometimes companies force other companies to merge (forced merger) or takeover others from some market compulsions. Even the financial strength of the acquiring company is not up to the mark; they borrow huge amount of loan from the market with higher interest rate to acquire, which sometimes reflect adversely to the companies' financial performance. In this backdrop we have considered the average debt change (in amount) of the acquiring companies in post-merger period compared to the pre- merger period.

Table- 5: Mean and S. D. of debt of acquiring firms in pre -and post- merger period

		Mean		Standard Deviation	
		Pre-merger	**Post-merger**	**Pre-merger**	**Post-merger**
Debt Changes	Full Sample	486.194	225.406	1128.219	276.261
	Large Acquirer	885.551	417.180	2094.811	512.900
	Small Acquirer	86.836	33.632	161.626	39.621

Authors' computation; Data source: Capitaline Database.

From Table 5 we observe that the average debt of acquiring companies in post-merger period has been reduced compared to pre- acquisition period, which is a positive sign for the acquiring companies. The fluctuation in loan amount has also been reduced in post-merger period for full sample, large acquirers as well as for small acquirers.

To test whether decrease in average debt in post-merger period is statistically significant or not we have again applied paired- t test and the result is shown in the following table:

Table-6: Results of Paired- t test

		Paired Differences		Comp. value and Sig.		
		Mean	Std. Error Mean	t	df	Sig. (2-tailed)
Debt Change: Post-Pre	Full Sample	-260.788	159.017	-1.640	59	.106
Debt Change: Post-Pre	Large Acquirer	-468.371	321.463	-1.457	29	.156
Debt Change: Post-Pre	Small Acquirer	-53.204	27.284	-1.950*	29	0.061

Authors' computation using SPSS 23.0

Table 6 shows that though there has been a decrease in average loan in post-merger period in most of the cases, such a decrease in average loan of the companies is not statistically significant. The decrease in average loan in 5 year post-merger period is only significant at 10% level for the small acquirers.

Thus, our observation is supporting the proposition that the Indian companies are not taking unbridled loans for managing their M&As and in making such event successful.

CONCLUSIONS AND SUGGESTIONS

Based on the above findings we may conclude that mergers of Indian corporate have in general added the earnings available to the equity shareowners. The management of the companies are involved in efficient management of financing and they are not taking random loan from the market for necessary infusion of fund to make the mergers and takeovers effective.

M&As have also increased significantly sales growth for the Indian companies in the post-merger period. Though the companies failed to increase their returns in terms of ROCE and RONW in post-merger period but the event made them to be capable to maintain their earlier profitableness.

Thus, it may be said that the scheme of M&As by the Indian corporate by and large help them to increase the market share in the industry, increase the earnings of shareholders, and to maintain profitability and sustainable growth. Lastly, we may say that similar analysis with a larger section may also be conducted to draw better inferences.

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Annexure: List of Sample Companies

Sl. No.	Acquirer Co.	Industry	Target Co.	Yr. of Merger
1	ACC	Cement- Major- North India	Damodhar Cement & Slag Ltd	2005
2	AmrutanjanHealt	Pharmaceuticals Indian-Formulations	Siva's Soft Drinks Pvt Ltd	2005
3	Arvind Ltd	Textiles- Denim Fabric.	Arvind Fashions Ltd	2005
4	Atul	Dyes And Pigments-Large	Amal Ltd	2006
5	BalkrishnaInds	Tyres- Large	BKT Moulds Ltd	2005
6	BannariAmm.Sug.	Sugar- Integrated	Maheswara Sugars Ltd	2005
7	Birla Corpn.	Cement- Major- NorthIndia	Talavadi Cements Ltd	2005
8	Bliss GVS Pharma	Pharmaceuticals Indian-Formulations	GVS Labs	2005
9	Carborundum Uni.	Abrasives and Grinding Wheels	ProdoriteAnticorrosives Ltd	2005
10	CEAT	Tyres- Large	Ceat Holdings Ltd	2005
11	Esab India	Electrodes- Welding Equipment	Esab Welding & Cutting System Limited	2006
12	Excel Crop Care	Pesticides / Agrochemicals Indian- Large	TML Industries Ltd	2010
13	Firstobj. Tech.	Computers Software-Medium / Small	Tractel Solutions Inc., USA	2010
14	Firstsour. Solu.	IT Enabled Services / Business Process Outsourcing	RevIT Systems Pvt Ltd	2010
15	Fischer Chemic	IT Enabled Services / Business Process Outsourcing	Rev IT Systems Pvt Ltd	2008
16	G S Auto Intl.	Fasteners	G S Automotives Pvt Ltd	2006
17	GallanttIspat	Steel - Sponge Iron	GallanttUdyog Ltd	2011
18	Ganesh Housing	Construction Housing-Medium / Small	Ganesh Infrastructure Pvt Ltd	2007
19	Gayatri Sugars	Sugar- Others	GSR Sugars Pvt Ltd	2010
20	Graphite India	Electrodes- Graphites	GKW Ltd	2005
21	Kamanwala Housing	Construction Housing-Medium / Small	Doongursee Diamond Tools Ltd(merged)	2008
22	Kanishk Steel	Steel - Medium / Small	Avanti Oil and Steel Industries Pvt Ltd	2008
23	Kavveri Telecom	Telecommunications Equipment- Medium / Small	Kavveri Telecom Infrastructure Ltd.	2008
24	Keerthi Indus	Cement- Mini - South India	Hyderabad Flextech Ltd(merged)	2006
25	Kellton Tech	Computers Software-Medium / Small	Tekriti Software Pvt Ltd	2005
26	Kerala Ayurveda	Pharmaceuticals Indian-Formulations	Katra Healthcare Pvt Ltd	2010
27	Konark Synth	Textiles- Texturising	Excel Synthetic Pvt Ltd	2010
28	KPIT Tech.	Computers Software-Medium / Small	KPIT Cummins Infosystems (Bangalore) Pvt Ltd	2007
29	HCL Technologies	Computers Software- Large	HCL Technology (Mumbai) Ltd & BPO Services Ltd	2009
30	Precot Meridian	Solvent Extraction- Large	Girdharilal Sugar & Allied Industries Ltd	2007

31	Prism Johnson	Solvent Extraction-Medium / Small	Prima Agro Ltd	2006
32	Proto Developers	Computers Software-Medium / Small	First Citizen Infrastructure Ltd	2010
33	PTL Enterprises	Tyres- Medium / Small	Artemis Health Sciences Ltd	2006
34	Quintegra Soln.	Computers Software-Medium / Small	Quintegra US Inc	2006
35	Rajapalayam Mill	Textiles-Spinning/Cotton/Blended Yarn- Ring Spg	Rajapalayam Spinners Pvt Ltd	2010
36	Rama Petrochem	Petrochemicals Others	Rama Fertilizers Private Ltd	2010
37	Regency Ceramics	Ceramics– Tiles	Regma Ceramics Ltd	2006
38	Eastcoast Steel	Steel - Medium / Small	Mind Factory Entertainment Pvt. Ltd.	2006
39	PratibhaInds.	Construction Civil / Turnkey - Medium / Small	One Metro India Pvt Ltd	2006
40	DIL	Pharmaceuticals Indian-Bulk Drugs	WhiteStripes Entertainment Ltd	2005
41	Chettinad Cement	Cement- Major- South India	Alagappa Cements Pvt Ltd	2005
42	DIC India	Chemicals- Speciality-Medium / Small	Rohit (Printing Inks & Paints) Industries Pvt Ltd	2005
43	Clariant Chemicals	Chemicals- Speciality- Large	BTP India Pvt Ltd	2005
44	Computer Point	Computers Peripherals / Accessories	Computer Point Education Ltd	2005
45	GHCL	Chemicals- Inorganic-Medium / Small	Colwell & Salmon Communications (India) Ltd	2007
46	gokakind	Textiles-Spinning/Cotton/Blended Yarn- Ring Spg	Forbes & Company Ltd	2011
47	Ginni Filaments	Textiles- Cotton Yarn- 100% EOUs	Abhinav Investment Pvt Ltd	2007
48	Glodyne Techno.	Computers Software-Medium / Small	Broadllyne Technologies Ltd	2010
49	Godrej Inds.	Personal Care Indian- Large	Godrej Consumer Biz Pvt Ltd	2007
50	Sabero Organics	Cement- Mini- South India	Amareswari Cements Ltd	2008
51	Sagar Cements	Cement- Mini- South India	Amareswari Cements Ltd	2008
52	SahyadriInds.	Cement Products	Swastik Roofing Ltd (merged)	2008
53	Saksoft	Computers Software-Medium / Small	Synetairos Technologies Ltd	2010
54	Tata Chemicals	Textiles- Spinning-Synthetic / Blended	Wyoming 1 (Mauritius) Pvt. Ltd	2007
55	Tata Motors	Chemicals- Inorganic-Medium / Small	Tata Finance Ltd(Merged)	2006
56	Tatia Global	Automobiles LCVs/HCVs	Tatia Stocks & Options Ltd	2008
57	Tech Mahindra	Textiles- Hosiery / Knitwear	iPolicy Networks Ltd	2008
58	Technocraf. Inds.	Computers Software- Large	Danube Fashions Ltd	2006
59	EID PARRY	Sugar– Integrated	Santhanalakshmi Investments Pvt Ltd	2005
60	Sangamindia	Textiles- Spinning-Synthetic / Blended	SPBL Ltd(merged)	2010

CHANGING PATTERNS OF SERVICEABILITY OF HEALTHCARE INFRASTRUCTURES: AN INVESTIGATION ON PROPOSED SMART CITIES OF WEST BENGAL

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ABSTRACT

Better healthcare service delivery is a pertinent parameter to improve Human development Index of a nation. Better service is indispensable without attaining the basic parameters of health like resource allocation, humanitarian approach along with service equivalents coordinated with proper accountability. In the current scenario of development and implementation of smart city projects, integration of healthcare service delivery have become a subject of paramount importance. In such a situation, it has become necessary to allot the financial as well human resources in proper constructs of service delivery .This action oriented pro-active approach will help in strengthening the pillars of existing as well as conceived smart city projects. This study is an empirical approach to mine out the dimensions emerged due to changing patterns of healthcare service delivery in proposed smart cities of West Bengal. The investigation has explored the parameters of service delivery among the respondents of proposed smart cities. The factors explored are amenability, trustworthiness, competency of the staff, and clinical competency along with timeliness. The findings will act as a value addition for the investors, stakeholders like Public institutions, private organizations, PPP organizations to integrate the strategies of healthcare service delivery with smart city projects effectively. The extracted parameters will also help in designing the serviceability of healthcare infrastructures of smart cities in resilient and sustainable way.

Keywords: Smart City, Infrastructure, Healthcare, Service Delivery, Patient Satisfaction, Factor Preferences

INTRODUCTION

The developing world's human development and movement landscapes have been characterized by the urbanization (Watson, 2009). Due to urbanization, large number of people move from one part to another city (Hove and Trimboi, 2011). By 2030,it have been expected that more than 60% of the world's population will reside in cities as compared to mere 30% in the era of 1960.But the overwhelming population increase of the urban cities is associated with the unplanned service delivery.

As a result of this there has been rise of social ills like overcrowding, crime, and bred of social ills ,lack of sanitation, waste dispose which is often transposed to the planned sections of the society. This has created an infrastructural gap which is creating hindrance in smooth service delivery. The resulting disruption of the service delivery in the unplanned urbanization have necessitate the need of assessing and extracting newly evolved service delivery patterns in healthcare organizations. . Healthcare being one of the standard criteria have been clubbed by the following indicators like Number of Inpatient hospital beds, physicians, nursing personnel per 100,000 populations, Average Life Expectancy, Under Age 5 mortality per 1000 live births, Suicide rate per 100k populations, and mental health population per 100k populations. Hence it is very much necessary to know the gap in infrastructural development based on the transition of service delivery patterns in the healthcare organizations of the smart cities so that they can be used as a inferential guide for addressing the infrastructural gaps in the healthcare industry in the newly evolved landscape of smart cities.

CONCEPT OF SMART CITY

Infrastructure development in the smart cities is gaining a wide consideration in the existing literature and summits for framing international policies (Albino et al. 2015; Koo et al. 2017; Mori and Christodoulou 2012). In this regard, smart city can be defined as a region which uses advanced and modern technology in order to accomplish daily activity. It uses intellectual ability along with modern computing techniques and algorithm to deal with various social, technical, economical aspects of the development which will ultimately led to the growth modern and superior infrastructure. (Bakıcı et al. 2013; Cruz-Jesus et al. 2017; Washburn et al. 2010; Zygiaris 2013; Chatterjee and Kar 2018b). According to the reports of the United Nations Population Fund, a majority of population will migrate to cities by 2050(UNFPA 2008). Similarly in Emerging Market Economy(EMEs) like India, large section of rural population is shifting to the city regions due to transition in urbanisation due to emerging "pull factors" like employment opportunity, better standard of living.an sense of security. This has led the reports that Urban areas expected to house 40% of Indian population and contribute 75% of India's GDP by 2030. The reports by Mckinsey in 2018 have predicted that by the next 15 years of

this century, 200 million people have transitioned from rural to urban areas in India. This changing patterns of the urbanisation is similar to patterns observed in other nations and is nearly combined to the population of like France, the United Kingdom, and Germany. In this regard, the Government of India have taken steps for integrated, comprehensive and inclusive development in urban areas. The forefront of the development should be on the physical infrastructure, institutional, social and economic infrastructure. The conceptualisation and genesis of smart city is a step forward in such direction in order to accomplish the vicious cycle of growth and development. The Smart Cities Mission is launched by the Government of India in order to provide better service delivery of basic amenities embedded with superior infrastructure, information technology, digital technology, public private partnership, and drafting new policies.

Priori evaluation of proposed smart cities in West Bengal

Four towns of West Bengal have been proposed. The four proposed cities are Durgapur, Haldia, Bidhannagar and Rajarhat, New Town, Durgapur. New Town is a fast growing planned satellite city of North 24 parganas district of West Bengal. The administrative regulation is controlled by New Town Kolkata Development Authority .It regulates the functions like maintenance of water supply, maintenance of drainage and sewerage, maintenance of road, street lights and waste disposal. The area mainly consists of huge acres of cultivated land which are acquired by the investors in a planned manner. Under the federal system of Indian central government and state government of west Bengal, new town is being proposed as smart green city.

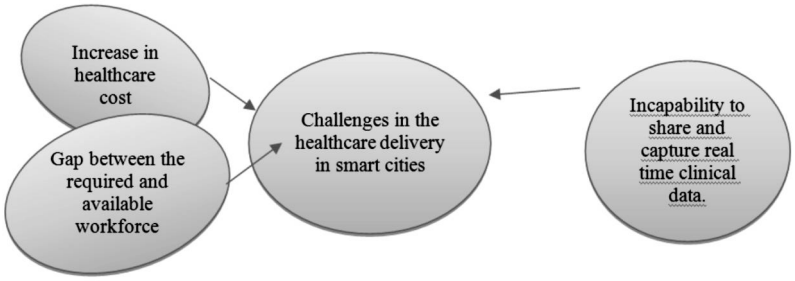

Fig 1: Framework of challenges faced by the smart cities in achieving healthcare targets

Increase in healthcare costs: Privatisation in healthcare have drastically increased healthcare costs. This creates barriers for developing nations like India to achieve universal health coverage. According to Sharma et al.2017,the universal health coverage in turns require regulation of Out-of pocket payments(OOP) as well FRP(Financial Risk Protection).According to the reports of the WHO, about 60% of

the healthcare expenditure belongs to the Out-Of Pocket payment category which have led to the growth of the volume of catastrophic healthcare expenditure(CHE).This escalating healthcare expenditure have led to the increase of the sections of the population below poverty line due to increased OOP expenses.

Gap between the required and available workforce

The availability of adequate manpower is the major concern for the organisational stakeholders, investors and policy makers (Kabene et al, 2006). Adequacy of the health workers is inevitable for the sustainable development for any organisation. Without adequate human resource, the service delivery of the organisation will not achieve consumer satisfaction. As a result in absence of this, the achievement of the Local and National health goals cannot be accomplished without having proper technical and social foundations (Frenk, Sepúlveda, Dantés and Knaul, 2003). According to WHO reports, in India, there is dearth of sufficient number of Human Resources to meet the growing demand of the healthcare service delivery though India have expanded the volume of workforce after the launch of National Health Mission.(Tiwarin, Neganidhi, Zodpey, 2018). Through the recent years, the number of training institutes have grown substantially due to increase in the number of training institutes for doctors, nurses, and healthcare workers. Through National Rural Health Mission, the number of the Accredited Social Health Activist (ASHA) have been expanded to 870089.Besides these, the National health Mission have also created the need for the growth of the HMP (Health Management Professionals). Sharma et al., opined that trained health management professionals are required for smooth execution of healthcare delivery as they work in hospitals, pharmaceutical companies, and health insurance organisations. They adopt customised strategy according to the real time condition to suit according to the multi-professional mode based on multiagency environment and multispectral platform.

Incapability to share and capture real time clinical data

Healthcare technology and it's extant delivery play a vital role in the healthcare system in the smart cities. This can be achieved fruitfully by incorporating the Information and communication technology(ICT) and Internet of Things(IOT).The Internet of Things(IOT) consist of following pillars like Big data ,mining, cloud, social and robotics and Artificial Intelligence(AI).Due to such advanced technology, real time monitoring of clinical data can be done along with the sharing of relevant data among its stakeholders (clinical research organizations, research groups, R&D department of the pharmaceutical companies).The feedback captured from the web-connected medical device and clinical observations and databases extracted from such observations help in effective accomplishing of the on-going projects and trials. System has focussed on the collection of KPI to excess and implement the healthcare programmes in future course of action.

RATIONALE OF THE RESEARCH

In contemporary scenario, the changing concepts of urbanization have emphasized the need of delivering the proper service in case of basic constructs of life like water supply, waste disposal, maintenance of roads, maintenance of street lights, community parks along with healthcare service delivery. Among these factors, there is increasing need of designing service delivery according to contemporary concepts of the urbanization and smart cities. In such cases, there is need of synchronization of service delivery dimensions based on the changing scenario of urbanization and smart cities. In such cases, understanding of perception of the patients about service delivery is inevitable for effective completion of the study. Existing researches (Taner and Antony, 2006) have also inferred the need of measuring and conceptualizing service quality dimensions in the healthcare organizations. In the healthcare organisations, the choice of the service provider is influenced by the perception of the patients. (Woodside et al., 1989).Thus the healthcare organizations must achieve "zero defections" in order to achieve the patient satisfaction level (Reichheld and Sasser, 1990). According to Lim and Tang (2000) in order to achieve the "zero defect", continuous improvement focussed on the improvement of service delivery is required. In such aspect, it is very much necessary to measure the device quality as it is having elusive and distinctive construct. The parameters like intangibility, inseparability, variability is unique to the service delivery (Zeithaml et al., 1990). Hence, in these present conditions, it is very important to frame the key constructs of the service delivery patterns of the healthcare organisations according to the framework and designs of proposed smart cities. This research will helps in priori analysis of the key parameters of the transition of the service delivery patterns as perceived by the patients and residents of the cities. This priori assessment of the perception will be a guide to the investors, government bodies; nodal policy makers related to healthcare to draft and laid emphasis on the extracted factors.

RESEARCH OBJECTIVE

The specific objective that we intend to meet

(i) To identify factors affecting the perception towards the service quality of the healthcare organizations.
(ii) To identify the variables which directly affect the satisfaction level of the patients.

RESEARCH METHODOLOGY

The research is partly descriptive and partly analytical. Data was collected among the patients of the proposed smart cities. To collect data, a structured questionnaire was distributed among the respondents without any discrimination among the

male and female respondents. A non-probability judgemental sampling has been implemented in the study. The questionnaire was translated and translated back to preserve the semantic consistency between the Bengali and the English Language. Modification of generic instrument of SERVQUAL (Parasuraman et al., 1988) has been adopted while framing the questionnaire. Proper measure of the validity have been done by performing apparent validity, construct validity, convergent validity, content validity, Representation validity, Face validity, criterion validity, concurrent validity and predictive validity. The data was collected among the hospitals of the smart cities through convenient sampling. A total of 100 questionnaires were selected among the 120 distributed questionnaires. The data collected through Self-administered questionnaire. Self-administered questionnaire is the survey in which respondent's takes responsibility of reading and answering the question. It is considered as superior mode for minimizing the bias and improving response rates. Secondary information have been collected from different secondary sources such as books, magazines, journals, and internet databases.

The questionnaire was subjected to statistical control and progressed through reliability and validity test. The factors affecting service quality of the healthcare have been extracted through – variables through data redundancy techniques and Factor analysis. The multiple regression analysis have been used to test the relationship between the independent variable and dependent variable. Bivariate correlation has been used to determine the relationship between the level of satisfaction of the patient and frequency of the visit of the patients to the hospital.

FINDINGS AND DATA ANALYSIS

The data obtained through questionnaire as subjected to data cleaning in order to identify missing value, data redundancy, sample characteristics and meet the assumptions of normality.

Reliability test on 24 variables

Reliability Statistics		
Cronbach's Alpha	Cronbach'sAlpha Based on Standardized Items	N of Items
.883	.890	24

Rotated Component Matrix

This component matrix sometimes stated to as the loadings, is the key output of principal components analysis. Matrix contains estimates of the correlations between each of the variables and the expected components.

Rotated Component Matrix[a]						
	Component					
	1	2	3	4	5	6
This hospital has modern looking Equipment	-.087	.215	.152	-.869	.128	.065
The physical facilities of hospital like infrastructural facility ,interiors are visually attractive and pleasant.	-.113	.864	.015	-.282	.074	.174
The front desk employees of the hospital are well groomed	.567	.324	.597	.127	.140	-.039
The materials used by the hospital employees while giving service are attractive and pleasant.	.387	.333	.710	-.070	-.254	.247
The working hours in hospital are in accordance to my convenience	.129	.079	.091	.206	.511	.912
The hospital delivers it's service within promised and assured time	.440	.417	.011	-.488	-.008	-.329
Whenever I face any difficulty, the hospital takes action with earnest efforts in solving that	.705	-.249	.189	-.474	.003	-.149
This hospital performs the service rightly since your arrival from the beginning.	.332	.252	.837	-.032	-.046	.182
The hospital delivers it's service within it's specified promised time.	.771	-.128	.332	.111	.211	.124
The employees of this hospital can say accurately when the service will be delivered and accomplished.	.302	-.374	.157	-.114	.657	.300
The waiting time to see doctor in this hospital is reasonable and justified.	.196	.016	.325	.043	.874	-.078
The employees of this hospital delivers service in prompt manner.	.478	.506	.078	-.257	.024	.449
The employees of this hospital are always ready and willing to help you	.541	.189	.094	.448	-.067	-.501
In spite of having tough schedule and work load ,the employess of this hospital are never too busy to respond to	-.021	.073	.803	.012	.219	-.081
The employees of this hospital are well behaved and courteous with me.	.738	.484	.159	.218	-.010	-.041
The behavior of employees of this hospital gives a sense of confidence in you.	.459	.546	.300	-.044	-.403	.260
I feel safe while opting for healthcare facilities in this hospital.	.205	.787	.235	.272	-.013	-.264

The employees of this hospital have sufficient knowledge and skills to solve my queries.	.065	.057	.771	.055	.360	-.039
The doctors of this hospital rightl explain about my health issues or condition	.103	.295	.005	.886	.218	.132
The doctors of this hospital gives me exact information about my treatment status and medications.	.202	-.192	.249	.872	-.014	.035
This hospital gives me personalized attention and importance.	.700	-.283	.522	.011	-.095	.283
The employees of this hospital realize my specific needs	.896	-.010	.029	.211	.197	.145
Doctors of this hospital behave with friendly and helpful manner with me.	-.066	.878	.287	-.058	-.200	.026
Doctors of this hospital gives enough consultation time to tell me what I need to know and answer my	.726	.382	.000	.251	.394	-.040
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 13 iterations.						

The result from the objective is tabulated as follows:

Serial Number	Statement of factors
1	Amenability
2	Trustworthiness
3	Competency of the staff
4	Clinical facility
5	Timeliness

Bivariate Correlations					
would you like to visit again				would you like to visit again	I am satisfied with service of the hospital
.	Spearman's rho	would you like to visit again	Correlation Coefficient	1	1.00
			Sig. (2-tailed)	.	.
			N	2	2
		I am satisfied with service of the hospital	Correlation Coefficient	1.000	.

			Sig. (2-tailed)	.	.
			N	2	2
yes	Spearman's rho	would you like to visit again and refer	Correlation Coefficient	1	.418
			Sig. (2-tailed)	.	.000
			N	73	73
		I am satisfied with service of the hospital	Correlation Coefficient	.	1.000
			Sig. (2-tailed)	.	.
			N	73	73
No	Spearman's rho	would you like to visit again and refer	Correlation Coefficient	1.	.502
			Sig. (2-tailed)	.	.000
			N	48	48
		I am satisfied with service of the hospital	Correlation Coefficient	502.	1
			Sig. (2-tailed)	000.	.
			N	48	48

Regression Analysis

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.214[a]	.046	.036	1.15783	.046	4.681	1	98	.033
2	.293[b]	.086	.067	1.13910	.040	4.249	1	97	.042

a. Predictors: (Constant), The employees of this hospital can say accurately when the service will be delivered and accomplished.

b. Predictors: (Constant), The employees of this hospital can say accurately when the service will be delivered andaccomplished., The doctors of this hospital rightl explain about my health issues or condition

c. Dependent Variable: I am satisfied with service of the hospital

Regression Coefficient Analysis of the model coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.914	.473		16.735	.000
	The employees of this hospital can say accurately when the service will be delivered and accomplished.	.445	.206	.214	-2.164	.033
2	(Constant)	7.340	.542		13.537	.000
	The employees of this hospital can say accurately when the service will be delivered and accomplished.	.457	.202	.219	2.259	.026
	The doctors of this hospital rightl explain about my health issues or condition	.296	.144	.200	2.061	.042

Regression Analysis

The results of the regression is given as follows
Patient Satisfaction=PS
PS= a + $b_{10}x_{10}$+ $b_{19}x_{19}$(As extracted after regression).
X_{10}= The employees of this hospital can say accurately when the service will be delivered and accomplished.
X_{19}= The doctors of this hospital rightl explain about my health issues or condition

PS=7.340+.457X10+.296X19
S.E=(.542)(.202)(.144)
T Values=(13.537)(-2.259)(.200)
R square(Adjusted)=0.067
Significance at 99%

DISCUSSION OF THE FINDINGS

The data analysed through rotated component matrix have been analysed through rotated component matrix and factors like amenability, trustworthiness, competency of the staff, clinical facility and timeliness of the staff have been obtained. The factors like amenability is defined by the variables like grooming of the employees, earnest efforts taken by the hospital in solving the problems of the hospital, delivering the service with in promised time.

It is encapsulated by other variables like courteous nature with personalized attention, consultation time provided by the doctors. Similarly the factor

trustworthiness has been encapsulated by the factors like behaviour of the employees which instils a sense of confidence among the patient. Feelings of being safe while receiving treatment and friendly behaviour of the employees alters the satisfaction level.

Competency of the employees is the third factor which is clubbed by the third factor which is clubbed by aspects like delivering the right clinical service to the patients, skill and knowledge of the employees in solving the queries in right way. The fourth factor is the clinical facility which is canopied by the capability of the doctors to explain the health issues. It is justified more by the variable like delivering information of treatment status and medication.

In regression analysis, F-test indicate whether the regression model is better fitted into the data as compared to the data which contains no independent variables. Analysis of regression coefficients explain about the relationship between the dependent variable and each independent variable. Thus in this calculation, it is better observed that F-test of regression analysis fits in with the other regression statistics. While hypothesis formulation, intercept only model have also been used that refers the model without any independent variables.

The F-test for overall significance has the following two hypotheses:

H_0: The null hypothesis indicates that the model fits the data with no independent variables.

H_1: The alternative hypothesis indicates that the model fits the data better then the intercept –only model.

In the statistical output ,the value of R square is equal to 0.067 which is near equal to 6.7% i.e patient satisfaction can be explained by the attitude of the employees to say accurately when the service will be delivered and ability of the doctors to rightly explain about the health issues or conditions. The significant F-value of 0.33 rightly indicates that H_0 is rejected and H_1 is accepted. Thus the model has good fit.

CONCLUSION

The study is an explorative and inferential guide for the urban planning. The study haver investigated the correlation between the design and parameters of the smart cities with the transition and assessment of the newly evolving service delivery parameters in healthcare organisation, The perception of the patients in such cities have been taken for this purpose in non-contrived settings.

The extracted parameters will help the designers, urban planners, infrastructure engineers, private and public stake holders in allocating the financial resources to

the proper infrastructural requirements in the healthcare industry. As contemporarily, the policy of the investment in the infrastructural development has been tightened.

Along with that a s the part of the Maximizing Financing for Development(MFD) strategy, the emphasis have been laid on the reduction of dependency of the public funds(i.e. tax payers money) for short term and long term investment. In such a situation India being part of the Emerging Market Economy (EMEs),it is very important to know the service delivery patterns required in the smart cities so that infrastructure gap with proper resource (financial, strategic and manpower) can be conceptualised, designed and addressed.

The study has justified such requirements for the development of smart cities the factors extracted can properly be used by the healthcare organizations to frame their strategies. The strategies based on this frame work can be utilized to frame and incorporate it in service quality policy and procedures for sustainable development of the healthcare organization.

Besides these, the study is a value addition in order to attract the private investors and leveraging the fund from them and thus reducing the infrastructural gaps in the healthcare industry by addressing the parameters as extracted from the study.

LIMITATIONS OF THE RESEARCH

The research has been conducted on the smart cities of the West Bengal. This study can be extended to wider geography so that deeper analysis of the infrastructure development of the smart cities with respect to healthcare industry can be done. The demographic analysis can be done in order to address the varied cognition among the patients with respect to service delivery patterns.

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