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Organizational and Environmental Factors Associated with Hospital Financial Performance: A Systematic Review

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This Special Issue of the *Journal of Health Care Finance* honors Dr. Louis C. Gapenski for his contributions to the fields of health care finance, public health finance and health administration. In his writing, teaching and mentoring, he served as a role model for all of us.

Organizational and Environmental Factors Associated with Hospital Financial Performance: A Systematic Review

Abstract

U.S. hospitals are challenged to improve their financial performance due to its ever increasing role for their survival, especially in the light of the recent legislative, and demographical developments such as Patient Protection and Affordable Care Act, value-based purchasing, and retirement of baby-boomer generation. Despite the increasing focus on financial performance, there is a lack of attention in systematic evaluation, analysis, and synthesis of the findings of the existing literature. This review aims to fill this gap by systematically aggregating 23,557 articles, applying a priori inclusion criteria, and qualitatively abstracting and quantitatively synthesizing 81 empirical studies from last 20 years (1996-2016). The quantitative assessment of investigated relationships between independent and dependent variables in these 81 studies suggest that the organizational factors as predictors and profitability measures as responses were the most frequently used variables. This review provides a valuable resource for both the practitioners and the researchers about the organizational and environmental predictors of financial performance by accounting for frequency, sign, and strength of the existing relationships. For example, out of 10 investigated relationships between teaching status and operating margin; 30% were significant and negative, and 70% were non-significant, whereas in the case of total margin out of 8 investigated relationships; 13% were significant and negative, 75% were non-significant, and remaining 13% were significant and positive. This review reveals the mixed findings and disproportionate focus on profitability measures in existing studies. It also identifies the major gaps and provides future directions.

Keywords: financial, financial performance, profitability, organizational, environmental

Introduction

After a slight dip in 2009, the average annual rate of the United States healthcare expenditures have started to increase, especially after 2014, as a result of both the coverage expansion through the Patient Protection and Affordable Care Act (ACA) and an increase in prescription drug spending for new treatments (National Center for Health Statistics, 2015). Among the categories of U.S. health expenditures, hospital expenditures occupy the largest share (38%) (National Center for Health Statistics, 2015) and hospitals bear the brunt of pressure from the resulting cost reduction policies. Some researchers have argued that payment methods such as pay for performance and healthcare quality initiatives have created additional financial pressures on hospitals (Langabeer et al, 2010). These pressures have led into mergers, acquisitions, conversions, (e.g. to Critical Access Hospitals) and closures among U.S. hospitals (Ly et al, 2011; Liu et al, 2011; Kaufman et al, 2016).

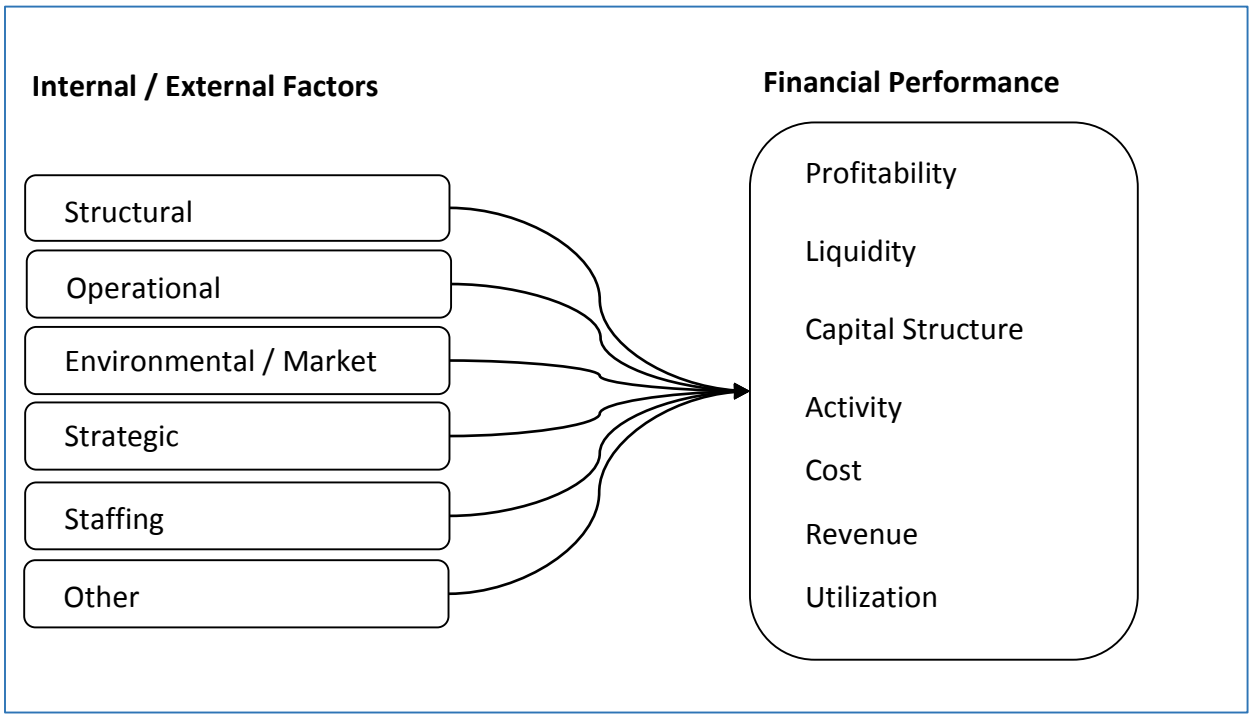
Strong organizational and financial structures are vital for hospitals to overcome the aforementioned pressures and sustain their existence. Hospitals need to maintain current services, develop new ones, and increase their quality while maintaining their financial margins. Given that hospitals need to be self-sufficient (Gapenski, 2007) and cannot rely solely upon governmental grants or endowment funds to meet their financial goals, they need to understand the factors that may contribute to their financial performance.

Although a large number of studies have been devoted to examining the factors associated with hospital financial performance, rather less attention has been paid to summarizing findings of these individual studies. Systematic reviews can provide a comparative knowledge-base which exhibits the research to date and make the findings readily available to policy makers and researchers. However, to date there has been only one systematic review on hospital financial performance (Holt et al., 2011). This study makes a contribution to the literature by expanding the work of Holt et al. 2011 to include: 1) a more comprehensive list of search terms; 2) both organizational and market determinants of financial performance; 3) a wider set of financial performance measures; such as profitability, capital structure, liquidity, and costs, and 4) studies published after 2010. Ultimately, the goal of this review is to synthesize the factors associated with hospital financial performance in a systematic manner for the benefit of researchers, practitioners, and hospital leaders.

Conceptual Framework

In our conceptual framework (Figure 1) we identified six main categories for internal and external factors associated with hospital financial performance: structural, operational, environmental / market, strategic, staffing, and other. There are seven dimensions of financial performance (Pink et al, 2007), namely profitability, liquidity, capital structure or leverage, activity, cost, revenue, and utilization (Cleverley and Cameron, 2003; Gapenski, 2007; Mclean, 2003; Nowicki, 2004; Zelman et al., 2003).

Figure 1. Conceptual Framework



Internal/external factors are defined as follows: 1) structural factors include measures related to a physical structure, or ownership categories such as size, teaching status, ownership, and system membership; 2) operational factors relate to hospitals' day-to-day operations, such as average length of stay, occupancy rate, admissions per bed, case mix, total discharges, and payor mix; 3) environmental factors are relevant to the market where a particular hospital is located, such as various regulations affecting the market, unemployment rate, median housing value, managed care penetration, competition, wage index, proportion of physicians per capita, and proportion of population over age of 65; 4) strategic factors refer to measures/events that occur as a result of strategic decision-making processes such as mergers, acquisitions, conversions, downsizing, and work redesign; 5) staffing factors refer to labor-related measures, such as physicians per bed, full-time RNs per 1000 inpatient-days, FTEs per bed, CEO turnover, non-nurse FTEs, and FTEs staff per occupied beds; 6) other factors include variables that could not be categorized into one of the aforementioned categories.

Seven dimensions of financial performance are defined as follows: 1) profitability refers to measures that indicate hospitals' ability in generating financial returns, such as profit margin and return on assets; 2) liquidity measures refer to hospitals' ability in meeting their cash obligations in a timely manner, such as days cash on hand and net days revenue in accounts receivable; 3) capital structure are those measures that indicate the extent to which a hospital uses debt and equity financing, such as debt service coverage and equity financing; 4) activity measures are those that indicate a hospital's ability in converting various assets or liability into cash or sales, such as total asset turnover and fixed assets turnover; 5) cost measures indicate the amount and mix of various types of costs, such as labor cost, hospital expenses per bed, total expenses per bed, and operating

expenses; 6) revenue measures indicate the amount and mix of various kinds of revenues, such as net patient revenue per bed, net revenue, net patient revenue per adjusted discharge, and revenue per admission; 7) utilization measures are those related to the use of fixed assets, such as occupancy rate and average daily census acute beds per swing beds.

Based upon the conceptual framework (Figure 1), the following research questions were developed to guide this review:

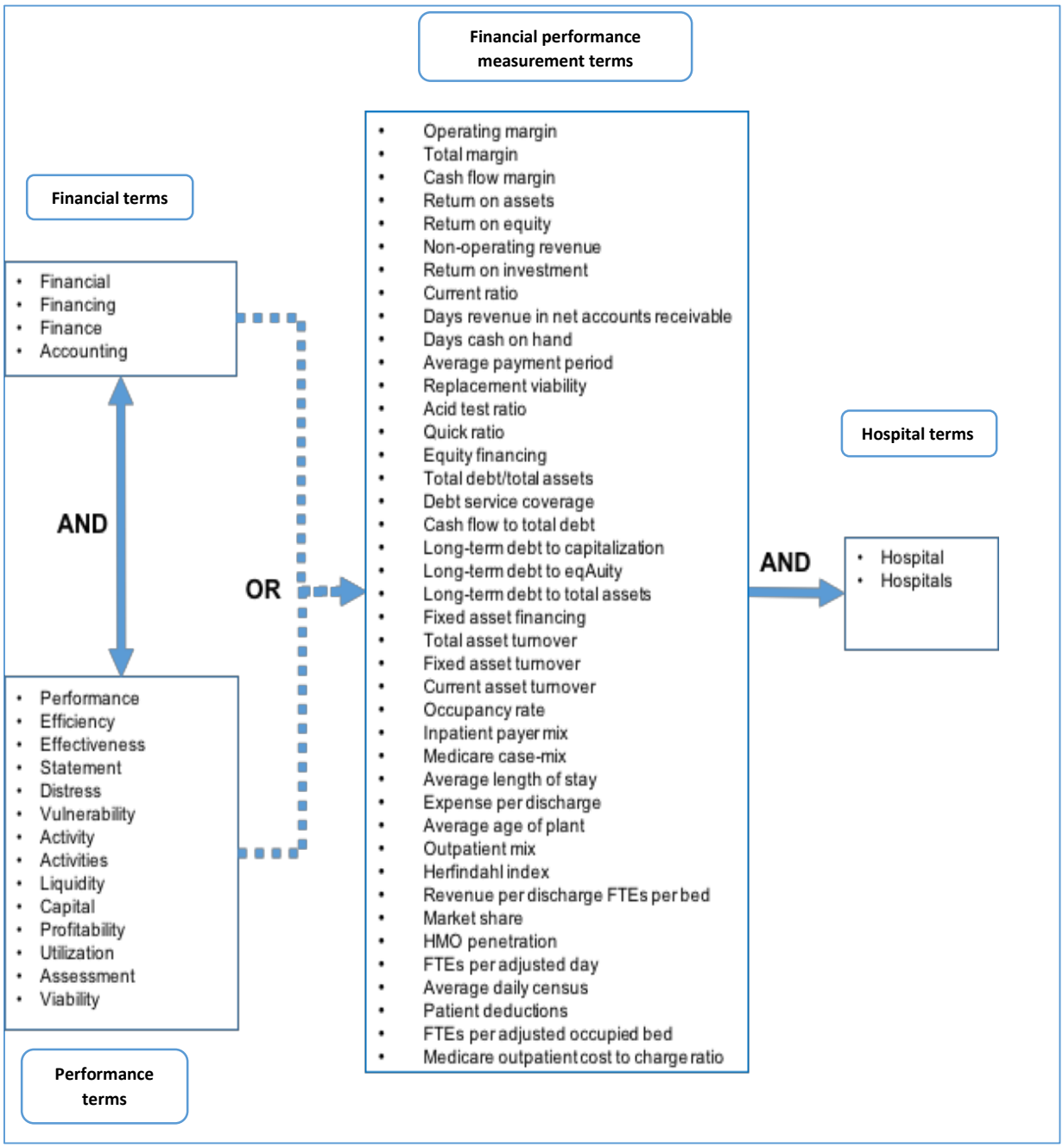
1. What types of hospital internal/external factors were used as determinants of hospital financial performance in the studies?
2. What types of hospital financial performance measures were used in the studies?
3. What types of research designs were used in the studies?
4. What are the major findings in regards to the relationship between the particular independent variables and the financial performance measures?

Methods

The literature search process included three steps. First, we identified search keywords by utilizing an earlier seminal article on financial performance measures (Pink et al, 2007), previous systematic review (Holt et al., 2011), and authors' own expertise. Second, we designed a search strategy to obtain more efficient search results from the data search engines (see Figure 2 for search strategy and keywords). Multiple searches were performed by using Boolean operators (OR, AND) in well-established data search engines including Medline/PubMed, Embase, Scopus, and Cochrane Library. Publications were filtered to those that were published between January 1996 and April 2016 in a peer-reviewed journal, written in the English language, and having keywords in the abstract or title.

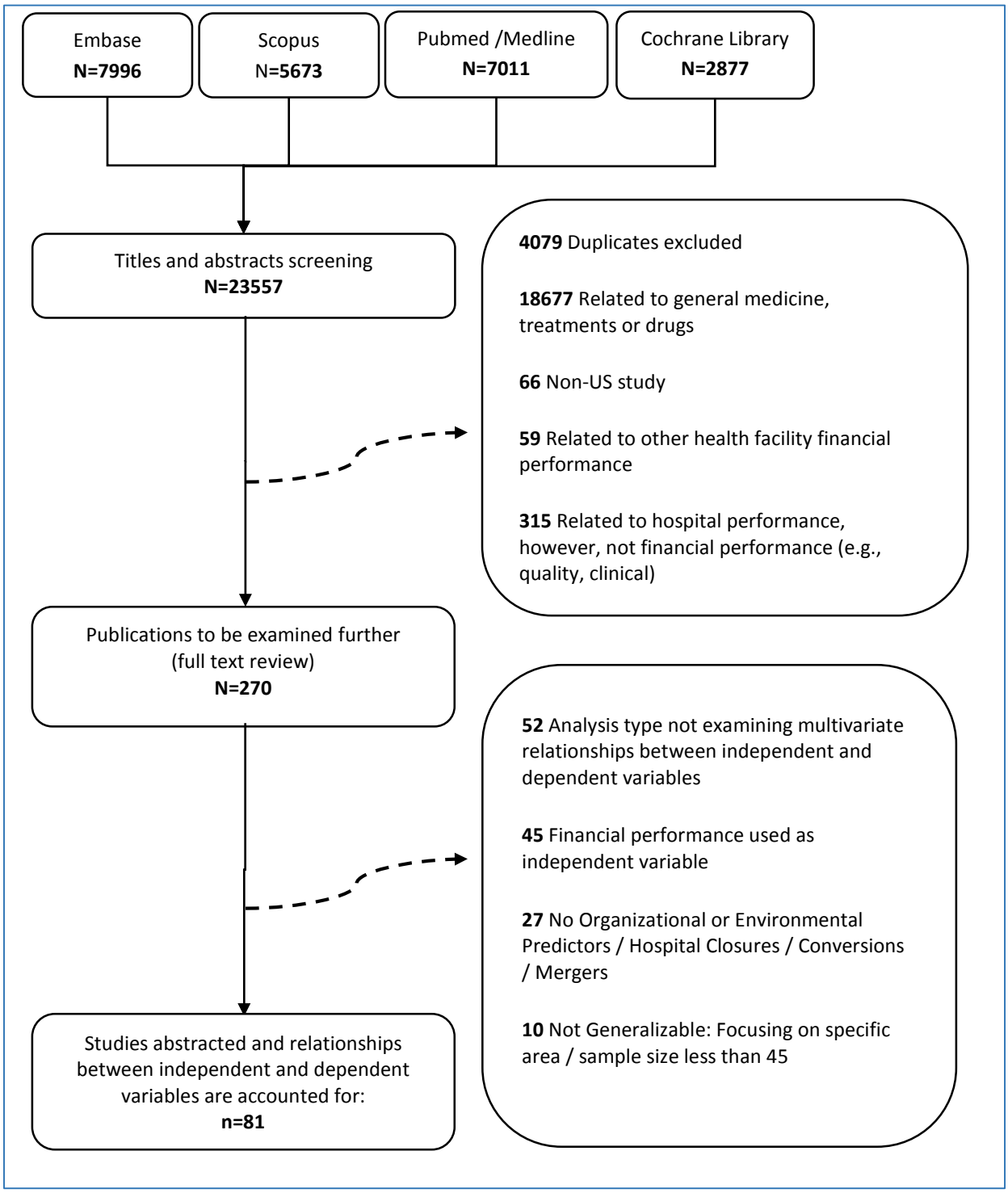
A total of 23,557 articles were identified from these searches including 7,996 from Embase; 5,673 from Scopus; 7,011 from Medline/PubMed; and 2,877 from the Cochrane Library. We downloaded all titles and abstracts (n=23,557) to Thomson Reuters' EndNote Reference Management Tool. We excluded 4,079 duplicate articles, resulting in 19,478 articles for further review. Then, we applied a priori-determined exclusion/inclusion criteria (Figure 3) that included the following: 1) removal of publications that were not relevant to hospital financial performance (i.e., related to general medicine, treatments or drugs, or other administrative areas); 2) exclusion of publications with non-U.S. study settings, given that the U.S. health system differs from the rest of the world; 3) exclusion of non-hospital healthcare providers; 4) exclusion of hospital performance studies that are non-financial (i.e., quality); 5) elimination of non-empirical studies, such as reviews, cases, reports, editorials, etc. To improve the integrity of results, all these steps were repeated in a different EndNote file. Ultimately the application of a priori criteria resulted in 270 full-text publications to be examined further.

Figure 2. Search Strategy and Keywords Used



The full-text review of publications resulted in further exclusion of studies, the ones that are 1) not examining multivariate relationships between independent and dependent variables (i.e., financial performance measures), 2) using financial performance as an independent variable instead of a dependent variable, 3) not having internal and/or external predictors of financial performance, or focusing solely on hospital closures, conversions, and mergers, and 4) having limited generalizability (i.e., focusing on specific area or with sample size less than 45). Application of a priori criteria resulted in 81 publications to be abstracted (Figure 3).

Figure 3. Flow diagram of included studies



For the remaining 81 publications, we developed coding worksheets with dropdown menus in Microsoft Excel 2016. In these coding sheets we captured general information and accounted for the relationships between independent and dependent financial measures in all of the 81 studies,

which then would be rolled into a quantitative descriptive table and a qualitative summary table. These coding sheets included the following: author, year published, data beginning year, data ending year, journal type (health-related, non-health), study objective, sample size, design (cross sectional, longitudinal), sample level (national, multiple states, single state), sample location (rural, urban, or not limited to a sub group), hospital type (acute care, specialty, or not limited to a sub group), hospital ownership (for-profit, not-for-profit, government, non-government, safety net hospitals, or not limited to a sub group), internal/external factors of the independent variables, financial outcome variables, analysis type, and key findings related to financial performance. We further coded the strength of the relationships as follows: very strong (p-value $\leq$0.001), strong (0.001 $\leq$p-value $\leq$0.01), medium (0.01 $\leq$p-value $\leq$0.05), and weak (p-value =0.1). In this study, we used Microsoft Excel 2016 and IBM SPSS Statistics 23 for coding and analysis such as cross tabulations, descriptive statistics, frequencies, summary tables, and charts. The coding was performed by three of the authors; first and second authors audited and confirmed the coded information.

Results

As indicated in our conceptual framework, our main goal is to account for and review the relationships between internal/external factors and financial performance dimensions. Our particular research questions aimed to account for, synthesize, and display: 1) the hospitals' internal/external factors that are used as the determinants of financial performance; 2) the type of financial performance measures used as dependent variables; 3) the types of research designs; and 4) the major findings in regards to the relationship between particular independent variables and financial performance measures. Appendix A (available from the Authors) provides qualitative summary descriptions for each of the 81 studies, such as study objective, internal/external factors, financial outcome measures, statistical analyses, and key findings regarding the financial performance measures. Below we describe tables and figures that summarize the key findings of the literature review.

Table 1 presents the descriptive statistics for the abstracted 81 financial performance studies. Approximately 78% of the publications appeared in health-related journals. With respect to research design, more than half (54%) of the 81 studies were longitudinal and 63% of them used a national sample for their study. The vast majority of the studies used acute care hospitals (90%) as their samples. Moreover, 62% of the studies had samples that included all ownership types. Lastly, sample sizes for the 81 abstracted studies ranged from 48 to 111,390 hospital-year observations with a mean of 3580.

There are a total of 2612 relationships between independent variables and financial outcome measures in the 81 studies. The use of several financial outcome measures resulted in different models within same study. Table 2 shows the five most commonly utilized independent variables for each internal/external factor category. Structural factors, with their frequency of 1097, are the most commonly used factors in the 81 financial performance studies. Ownership status (n=165), Size (n=149), Case mix (n=113), and Herfindahl-Hirshman Index (n=100) were the most frequently used among all independent variables.

Table 1. Descriptive Statistics for the Abstracted 81 Financial Performance Studies

Descriptive (N=81)	Frequency	Percentage (%)
Journal Type		
Business (non-health)	18	22.2
Health-related	63	77.8
Study Design		
Cross-Sectional	37	45.7
Longitudinal	44	54.3
Sample Level		
National	51	63
Multi states	5	6.2
Single state	25	30.9
Hospital Type		
Acute care	73	90.1
Acute care and Specialty	1	1.2
Specialty	4	4.9
N/A*	3	3.7
Hospital Ownership		
Not-for-profit	12	14.8
For-profit	6	7.4
Government	3	3.7
Non-Public (non-government)	4	4.9
Government and Not-for-profit	1	1.2
Not limited to a subgroup	55	67.9
Descriptive Statistics on Study Samples (N=81) for # of hospitals		
Mean	3580	
Range	(48 - 111,390)	
Standard Deviation	12,797	

* There was not enough information in the study.

Figure 4: The Distributions of Publications (n=81) by the Publication Year

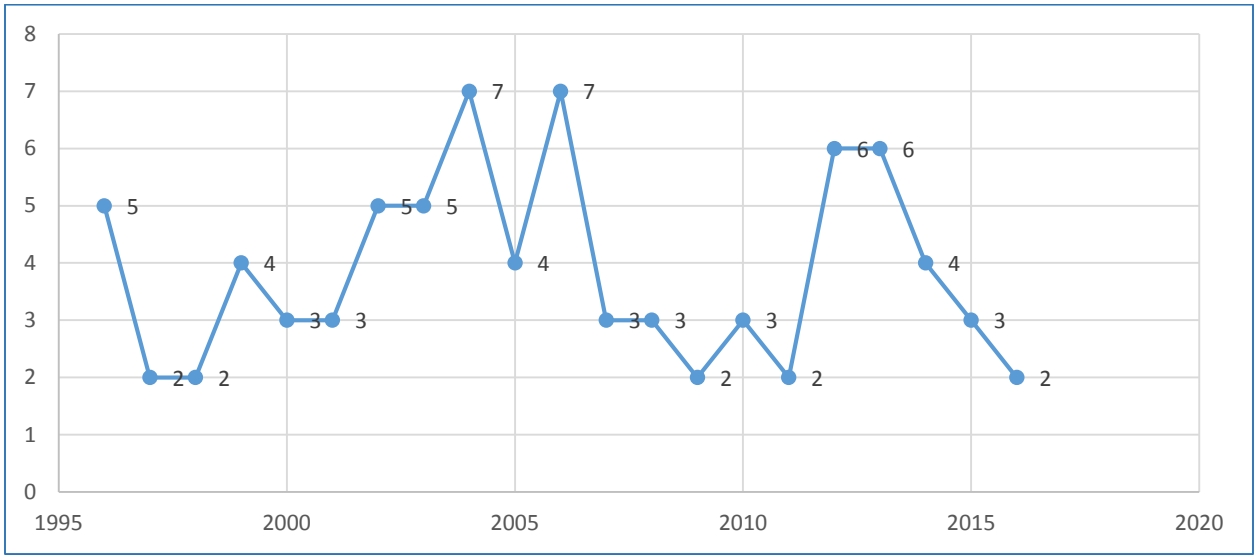


Figure 5: The Distribution of Study Periods (in years, n=393) for the 81 Abstracted Studies

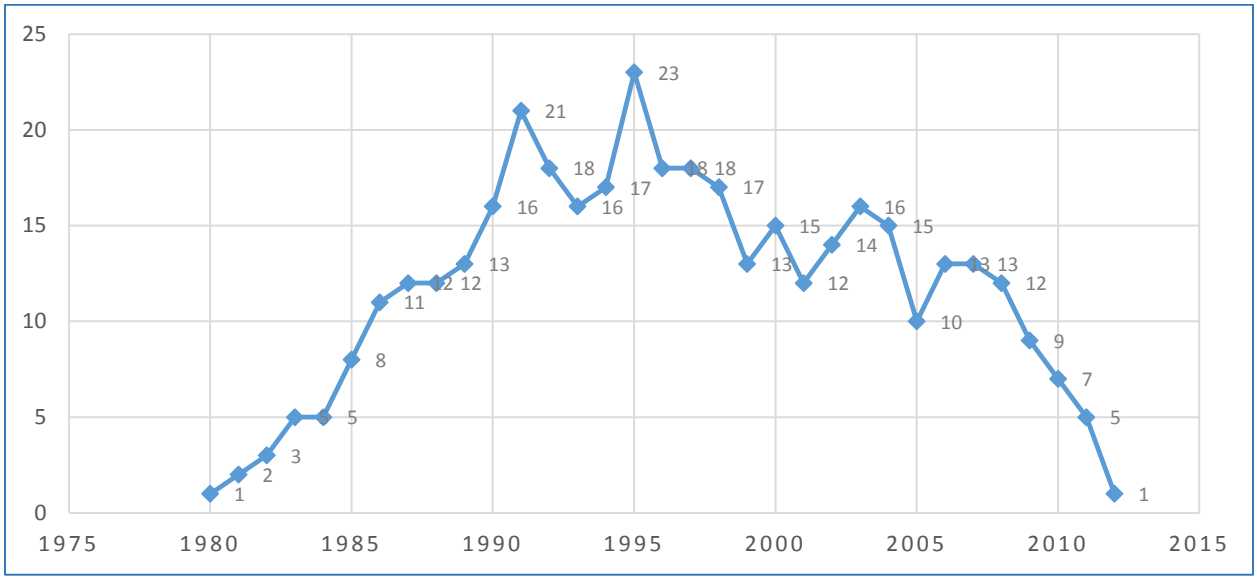


Table 2: Frequencies for the Five Most Commonly Utilized Independent Variables for Each Internal/External Factor

Independent Variables and Corresponding Factors	Frequencies
Structural Factors	**1097**
Ownership Status	165
Size	149
Teaching Status	94
Hospital System Membership	70
Rural Location	21
Operational Factors	**596**
Case Mix	113
Medicare Percentage	52
Occupancy Rate	51
Medicaid Percentage	47
Average Length of Stay (ALOS)	45
Environmental Factors	**586**
Herfindahl-Hirshman Index	100
Per Capita Income	44
Unemployment	31
HMO Penetration	28
Population	28
Strategic Factors	**159**
For-Profit to Not-For-Profit Conversions	8
Transition (from Medicare classification to another)	8
Leveraged Buyout	7
Years to Adoption (External Long Term Care (LTC) Strategy)	6
Years to Adoption (Internal LTC Strategy)	6
Staffing Factors	**112**
Full-time-equivalents (FTEs)	15
Physician Staffing FTEs	9
RN FTEs	6
Staffing Ratio	6
Administrative Turnover	4
Other Factors	**32**
% of Patients Who Definitely Recommend the Hospital	3
% of Patients Who Definitely Would Not Recommend the Hospital	3
% of Patients Who Rated the Hospital 6 or Lower on a 10-Point Scale	3
% of Patients Who Rated the Hospital 9 or 10, on a 10-Point Scale	3
Time Trend	3

Table 3 displays the frequencies for the most commonly utilized dependent variables and their corresponding financial dimensions. The frequency of profitability dimension (1392) is more than 3 times higher than the next two highest frequency dimensions (i.e., Cost and Revenue). The most frequently used profitability measures were Operating Margin (290), Total Margin (262), and Return on Assets (173). Dimensions such as 'activity', 'capital structure', and 'liquidity' were the least examined in the literature.

Table 3: Frequencies for the Five Most Commonly Utilized Dependent Variables and their Corresponding Financial Dimension

Dependent Variables and Corresponding Financial Dimensions	**Frequencies**
Profitability	**1392**
Operating Margin	290
Total Margin	262
Return on Assets	173
Cash Flow Margin	67
Cash Flow	57
Cost	**471**
Operating Expenses	60
Cost Per Discharge	47
Total Operating Expense per Adjusted Discharge	28
Average Expenditure	26
Labor Cost/ Service ($1000)	24
Revenue	**426**
Net Patient Revenue/Operating Revenue	95
Net Patient Revenue per Adjusted Discharge	58
Total Revenue	42
Average Net Revenue	26
Average Revenue	26
Other	**150**
Financial Strength Indicator (FSI)	43
Financial Distress Measure (Altman Z Score)	17
Financial Distress Measure (A Negative 3-Year Average Profit Margin)	17
High-Medicaid Payer Mix	15
Total Operating Income Per Adjusted Discharge	14

Table 3: Continued

Dependent Variables and Corresponding Financial Dimensions	Frequencies
Utilization	**85**
Occupancy Rate	39
Charge Per Medicare Case	11
FTE per Census	11
Total Full-Time-Equivalent (FTE) Staffing	11
Average Length of Stay (ALOS)	9
Liquidity	**60**
Days Cash on Hand	30
Net Days Revenue in Accounts Receivable	16
Net Patient Days in Accounts Receivable	14
Capital Structure	**32**
Debt to Service Coverage	16
Equity Financing	16
Activity	**11**
Total Assets Turnover	11

Table 4 presents the frequencies and types of relationship between internal/external factors and financial performance dimensions. The most commonly explored relationships were between structural factors and profitability dimension (Table 4). Out of 610 (circled in red in Table 4) coded relationships between structural factors and profitability dimension 93 (15%) were significant and negative, 310 (50%) were non-significant, and 151 (25%) were significant and positive. As one can observe from Table 4, the majority of the investigated relationships generated non-significant results, even for the most commonly used dimensions such as profitability (Table 4).

We further explored the number and strength of the most frequently explored relationships between the independent and dependent (financial) variables (Table 5). Specifically, we display the strength and frequencies of relationships occurring five or more times. The percentages for Negative (N), Non-Significant (X), and Positive (P) relationships are displayed in parentheses under each frequency. For example, out of 13 explored relationships between Herfindahl-Hirshman Index (HHI) and Operating margin, 15% were significant and negative (N), 46 % were non-significant (X), and 38% were significant and positive (P). Despite the mixed findings for most relationships, there are a few relationships that were primarily positive.

1. Case mix was positively associated with both high operating expenses and higher operating revenues, resulting in no significant association with operating margin.
2. Greater size is associated with both higher operating and total margins.
3. Higher occupancy rate is associated with both higher operating and total margin.

Table 4: The Frequencies and Types (N=Negative, X=non-significant, P=positive) of Relationships between Internal/External Factors and Financial Dimensions

	Dependent Variables														
Internal/ External Factors (Independent)	**Activity**			**Capital Structure**			**Cost**			**Liquidity**			**Other**		
	N	**X**	**P**	**N**	**X**	**P**	**N**	**X**	**P**	**N**	**X**	**P**	**N**	**X**	**P**
Structural	0	2	0	2	10	4	29	89	65	6	24	10	9	32	10
Operational	0	4	1	0	3	3	20	48	45	0	10	0	2	24	5
Environmental	0	3	0	1	1	2	19	73	30	1	2	1	8	22	12
Staffing	0	0	0	0	0	0	3	8	5	0	0	0	1	1	1
Strategic	0	1	0	0	2	0	11	19	5	0	1	1	1	1	2
Other	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Regulative	0	0	0	0	2	2	0	1	0	0	1	3	1	1	0
Dimensions Total	**0**	**10**	**1**	**3**	**18**	**11**	**83**	**238**	**150**	**7**	**38**	**15**	**22**	**81**	**32**

	Dependent Variables									
Internal/ External Factors (Independent)	**Profitability**			**Revenue**			**Utilization**			
	N	**X**	**P**	**N**	**X**	**P**	**N**	**X**	**P**	**Factors Total**
Structural	93	366	151	23	74	67	10	11	10	**1097**
Operational	56	178	90	11	55	36	0	2	3	**596**
Environmental	45	169	49	15	82	23	5	15	8	**586**
Staffing	15	49	18	1	4	4	1	1	0	**112**
Strategic	7	52	15	7	12	3	1	15	3	**159**
Other	10	6	8	3	0	2	0	0	0	**32**
Regulative	5	6	4	0	3	1	0	0	0	**30**
Dimensions Total	**231**	**826**	**335**	**60**	**230**	**136**	**17**	**44**	**24**	**2612**

Table 5: The Frequency and Percentage of Negative (N), Non-Significant (X), and Positive (P) Relationships among the Most Frequently* Explored Relationships between Independent and Dependent Variables

Independent Variables	Dependent Variables						
	Cash Flow	**Cash Flow Margin**	**Operating Expenses**	**Operating Margin**	**Operating Revenue**	**Return on Assets**	**Total Margin**
Environmental Factors							
Herfindahl-Hirshman Index	**5** (20%N, 40%X, 40%P)	**5** (O%N, 80%X, 20%P)		**13** (15%N, 46%X, 38%P)		**9** (11%N,78% X, 11%P)	**11** (36%N,55% X, 9%P)
Per Capita Income				**3** (0%N, 67%X, 33%P)			**6** (50%N,50% X, 0%P)
Operational Factors							
Average Length of Stay				**6** (17%N, 50%X, 33%P)		**8** (50%N,25% X, 25%P)	**5** (40%N,60% X, 0%P)
Case Mix			**5** (20%N,20%X, 60%P)	**8** (0%N, 75%X, 25%P)	**14** (0%N,21%X,79%P)	**7** (0%N, 86%X, 14%P)	**8** (25%N,63% X, 13%P)
Medicaid Percentage				**11** (18%N, 45%X, 36%P)		**9** (22%N,56% X, 22%P)	**8** (25%N,75% X, 0%P)
Medicare Percentage				**9** (11%N, 78%X, 11%P)		**9** (11%N,67% X, 22%P)	**8** (25%N,75% X, 0%P)
Occupancy Rate				**6** (0%N, 0%X, 100%P)		**8** (25%N,25% X, 50%P)	**5** (40%N, 0%X, 60%P)
Structural Factors							
For-Profit Ownership compared to NFP				**6** (0%N, 50%X, 50%P)			**9** (22%N,56% X,22%P)
Government Ownership compared to Private		**5** (O%N,80% X,20%P)		**10** (40%N, 50%X, 10%P)		**7** (0%N, 71%X, 29%P)	**8** (0%N,63%X ,38%P)
System Membership				**11** (9%N, 73%X, 18%P)			**8** (13%N,63% X, 25%P)
Rural Location				**6** (0%N, 83%X, 17%P)			
Size		**6** (17%N,83 %X, 0%P)		**20** (5%N, 50%X, 45%P)	**5** (0%N,60%X,40%P)	**13** (15%N,69% X, 15%P)	**15** (7%N, 33%X, 60%P)
Teaching Status	**5** (O%N, 80%X, 20%P)			**10** (30%N, 70%X, 0%P)		**13** (23%N,46% X, 31%P)	**8** (13%N,75% X,13%P)

*Displays shows relationships with frequencies of 5 or more.

Discussion and Future Directions

In this systematic literature review, we quantitatively and qualitatively summarized the studies on financial performance from the last 20 years (1996-2016), in which our colleague Dr. Louis C. Gapenski had substantial and unforgettable impact on the knowledge-base of financial management of healthcare organizations. As depicted in our conceptual framework (Figure 1), we aimed to account for and synthetize the relationships between hospitals' internal/external factors and dimensions of financial performance. Our initial search by using an extensive selection of keywords generated 23,557 publications from four well-established databases. The elimination of duplicates and non-relevant studies by using a-priori criteria resulted in 81 financial performance studies to be abstracted. After coding the information about these studies and the relationships between independent variables and financial performance measures (i.e., dependent variables), we quantified, analyzed and synthetized our findings into several tables and figures. We also summarized qualitatively some of the critical and non-quantifiable information from these 81 financial performance studies in Appendix A (available from the Authors).

Based upon our results, we have several major conclusions and recommendations for future research. First, we observe the disproportionately high use of profitability measures in the reviewed studies of financial performance in the last 20 years (1996-2016). The frequencies for performance measures that fall into financial dimensions such as activity, capital structure, liquidity, and utilization were substantially lower than the profitability, cost, and revenue dimensions (See Table 4). This is not surprising given the common utilization and resulting familiarity of profitability, revenue, and cost measures both among practitioners and researchers. However, given that the majority of hospitals are not-for-profit, it may be important to utilize additional financial measures and perspectives than in industries that are mostly represented by for-profit organizations. For example, examining the efficiency and productivity measures can provide insights on the potential interventions that can ultimately lead to better profitability (Velez-Gonzalez et al., 2012). Therefore, for future studies we recommend the use of more diversified financial performance measures while continuing to use profitability, cost, and revenue measures. Second, we observe that the last 16 years (2000-2016) were not as frequently explored as the previous 10 years (1990-2000) (Figure 5). Figure 5 shows an upward trend for the study periods after 1980 with a peak around 1995. This trend seems to be associated with the implementation of DRGs in 1983 and later growth of managed care in the early 1990s, and the interest in examining its impact on hospital financial performance. Also the recent 50% reduction in the numbers of publications in 2015 from 2012's number of 6 to 3 (Figure 4) suggests that there is a need for more publications especially using longitudinal data after 2010.

Third, the relationships between teaching status, payer mix, and financial performance should be explored in future studies. The relationship between teaching status and financial performance varies based on the measure of financial performance used. Out of 10 relationships between teaching status and operating margin, 30% were negative and 70% were non-significant. However, when total margin was explored, there were 13% positive relationships, 12% negative relationships, and 75% non-significant with teaching status. This suggests the importance of non-operational revenues for teaching hospitals. Similarly, while 36% of studies found a positive association between a higher proportion of Medicaid and operation margin, the opposite was observed when examining total margin, whereas Medicaid was to a larger extent negatively

associated with total margin. This suggests that hospitals with a higher Medicaid census have greater pressures to lower costs as a mechanism to improve their operating margin, since they may not have the same access to non-operational revenues as other hospitals, which can influence their total margin.

Fourth, we found mixed findings for most of the relationships explored in the 81 abstracted studies, and a high proportion of non-significant results among the relationships explored. Interestingly, most of the investigated relationships between internal/external factors and financial dimensions exhibit similar to a normal distribution with non-significant findings in the middle. This may be attributed to the differences in study samples, periods, and designs. Almost half (46%) of the abstracted studies utilized cross-sectional designs which would be considered less reliable than longitudinal study designs (Table 1). Another potential reason for the variation in findings may emerge from the differences among individual states given that 31% of studies used a single state in comparison to the 63% of studies with national samples. Therefore, to address these mixed findings and high proportions of non-significant results, more studies are needed, especially ones with longitudinal study designs.

Despite the mixed findings for most of the observed relationships, there are a few relationships that can be highlighted. First, positive associations between hospital size and both operating and total margins suggest economies of scale (Table 5), or the ability of larger hospitals to spread their costs on larger numbers of services and generate better margins. Second, case mix is associated with a positive association with both operating revenue and operating expense, but no significant association with operating margin. This indicates that as the severity of cases increases for hospitals, both revenues and expenses increase as well. As both sides cancel each other out, this results in non-significant operating margin. Therefore, our findings suggest that case mix does not affect operating profitability, and that reimbursement for higher case mix seems to be commensurate with the higher level of resources required.

Lastly, higher occupancy was primarily associated with both higher operating and total margins. A potential mechanism explaining this association is economies of scale, as more occupied beds help to spread fixed costs over a greater number of patients. Future studies may develop and test various interventions related to occupancy rate's potential in generating positive impact on hospital margins.

Conclusion

This study is the most comprehensive systematic review of the existing research between 1996 and 2016 on hospital financial performance. It provides a general view and trends for the last 20 years and accounts for the details of the relationships between various independent variables and financial performance outcome measures.

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