



## MANAGEMENT FRAMEWORKS AND METHODS: PERSPECTIVES AND TOOLS FOR FINANCIAL SERVICE PROFESSIONALS

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### **ABSTRACT**

In this paper, we highlight theoretical frameworks and practical tools in the management literature, which offer valuable perspectives for financial service professionals. More specifically, we review the core logic related to the creation of competitive advantage, as well as the necessary foundations for the application of readily-available analytical tools such as data envelopment analysis (DEA). We then integrate these foundations with the financial services landscape so that financial service professionals can leverage their understanding in areas of stock selection, portfolio management, data analytics, and practice management.



## Introduction

Competitive advantage stems from a firm's ability to create a unique value proposition for a specific customer segment (Porter, 1985). In order to create uniqueness, firm decision-makers generally allocate company resources to market-based activities such as research, marketing, and customer service (Ghemawat *et al.*, 1998). If done optimally, firms turn these activities into an insight or experience that creates unique value, which customers reward with a one-time purchase or ongoing relationship, thus providing a return on investment (ROI) and advantage versus industry rivals. However, in the hyper-competitive financial services marketplace, sustainable differentiation of services, which generally consist of some form of technical advice (e.g., tax, legal, insurance), report (e.g., valuation, economic damages), or transaction execution (e.g., stock purchase/sale, insurance contract) is quite difficult. It is against this backdrop that this paper integrates theoretical management foundations and tools with the financial services landscape. An understanding in these areas will help financial service professionals (FSPs) evaluate investment alternatives for clients while also offering valuable insights for practice management.

The contributions in this paper are four-fold. First, core management principles and tools that apply to FSPs when providing services to their clients are discussed. For example, by understanding the core drivers of competitive advantage, FSPs will be better equipped to identify undervalued individual stocks. In short, if FSPs recommend investment in firms with current or future sustainable competitive advantage for client portfolios it should theoretically lead to superior client stock returns. This knowledge can also be applied in a host of other areas beyond individual stock selection, such as asset allocation with sector rotation tactics, hedge fund selection, or private equity investment. Second, this article contributes to the dialogue on financial services practice management. Applying principles about competitive advantage to FSP practices should help to shape investment decision-making of firm partners or principals. More specifically, being able to identify drivers of uniqueness in the marketplace should guide specific firm-level investment in employee training programs, marketing, and branding initiatives, research techniques, and customer service procedures. Third, the theories and tools discussed in this paper are generally ignored in the financial services space. This lack of attention is likely due to the fact these topics are not typically covered in finance programs at universities or in industry-standard education. As such, this paper attempts to fill a critical knowledge gap in the financial services industry. Fourth, and perhaps most importantly, data envelopment analysis (DEA), the main analytical tool in this paper, allows advisors to incorporate complementary measures, financial and non-financial (i.e., environment, social responsibility, and governance (ESG)) into custom portfolios reflecting client desires and needs.

The rest of the paper is organized as follows. The paper begins with brief reviews of the literature on competitive advantage and data envelopment analysis, followed by discussions about how to apply management logic and DEA in the financial services space, respectively. Finally, a general discussion and conclusion are provided.

## An Introduction to Theories of Competitive Advantage

The Resource-Based View (RBV) is rooted in the seminal work of Edith Penrose (1959), which asserts that firm resources such as internal teams, processes, and assets drive firm success. According to Wernerfelt (1984), Barney (1991), Peteraf (1993) and others, resources are firm-controlled tangible and intangible assets, which include physical resources (i.e., plant and equipment, raw materials)



(Williamson, 1975), human capital resources (i.e., insight, training processes) (Becker, 1964), and organizational capital resources (i.e., structure, corporate controls, culture) (Tomer, 1987). These resources, therefore, are the foundation for competition in the marketplace. Accordingly, the goal of the management team is to develop its resource portfolio in a way that creates a unique value proposition. This resource development occurs through either acquisition, internal development, or partnership with outside entities.

Wernerfelt (1984) and Barney (1991) helped to popularize RBV by effectively articulating the fundamental assumptions in the RBV framework, which posits that firm resource differences are potentially a source of superior firm performance. The RBV explains how firms can extract "rent" and develop sustainable competitive advantage through the development of firm resources which are valuable (i.e., create value that customers will pay for), rare (i.e., not readily available), inimitable (i.e., duplication is not possible), and non-substitutable (i.e., an alternative is not available), collectively forming the VRIN framework (Barney, 1991). In other words, firms should seek to develop resources that enable the formation of "resource position barriers" which are analogous to entry barriers (Wernerfelt, 1984). Resources with position barriers provide some protection from industry forces while contributing to a firm's strategic intent (Brown, 2015; Brown & Kline, 2020). Not surprisingly, human capital resources and organizational capital resources have arguably interested scholars the most. This interest stems from research suggesting that off-the-shelf components should not yield a competitive advantage, but rather that intangible assets, which require internal development (i.e., training practices and cultural development) are more significant value generators (Conner, 1991).

Extending this theme, management theorists have developed a related theory about competitive advantage called the Knowledge-Based View (KBV). KBV theorists posit that knowledge is the preeminent productive resource (Grant, 1997). Knowledge-based resources are often critical intangible resources that contribute to competitive advantage as firms invest in practices that encourage creativity, innovation, and systematic knowledge dissemination (Curado and Bontis, 2006; Winter and Szulanski, 1999).

Researchers argue that individuals and firms utilize knowledge, explicit (i.e., things that are codifiable), and tacit (i.e., know-how created through our experiences), in order to compete effectively. Explicit knowledge can be written down and easily transferred. As an example, consider a simple set of steps to follow in a recipe for making pasta. This information can be transferred and successfully utilized by most members of our society without much effort or error. Now consider a world-renowned chef cooking a signature dish. To explain how to replicate the signature dish, the chef will need to write down the necessary steps (i.e., order and measurement of ingredients) and a series of if-then statements based on his/her experience. As dishes increase in complexity, it becomes less likely that the chef will capture all factors that could cause variation in the finished product. In real-time, the expert chef adjusts based on "gut instincts" that resulted from thousands of other dishes prepared over time. The integration of facts (i.e., the base recipe) and experience captures the inherent nature of the task and provides a basis for advantage for the chef. Simply put, the knowledge in the chef's mind is difficult to copy. Consistent with this theme, KBV theorists assert that a competitive advantage rests in the ability to create and disseminate codifiable and tacit knowledge, at various levels of the organization, as well as the firm's ability to appropriate the value generated from it (Coff, 1999).



## Why Should FSPs Embrace RBV and KBV?

There are two primary reasons why FSPs should embrace RBV and KBV (collectively, theories about competitive advantage). First, the theoretical foundations provide a blueprint for practitioners to follow in their quest for competitive advantage. Resources that are hard to copy lead to firm advantages that drive market share, cash flow, and valuation. Understanding the source of advantage contributes to the analysis of firms in the marketplace. By using this logic, asset managers will be in a better position to identify firms with resource positions that are defensible, thus providing substantial long-term investment opportunities for their client portfolios. Second, RBV and KBV logic contributes to the practice management dialogue and helps managers formulate competitive moves (Zane & Kline, 2017). The central tenets of these theories help management teams to build the optimal firm infrastructure for competition. As experts in their industry, top management teams (TMTs) identify unique resource positions and create asset allocation plans for the development of such resources.

## How Can FSPs Apply Theory in Practice?

In order to develop competitive advantage in practice, managers must first embrace the following perspective: a firm is a portfolio of assets. As FSPs embrace this view, they will more likely see and isolate the core resources that underly the way investible firms can compete. Recent work on firm-level performance by Andonova and Ruiz-Pava (2016) showed that measures of intangible assets like brands, patents, and know-how were positively correlated with firm performance (i.e., return on assets and return on sales) and advantage. While research like this supports competitive advantage theory in general, readers should note that the assets driving advantage are likely industry-specific and can vary significantly over time due to environmental factors such as government regulation, technological changes, and changing consumer preferences. This foundation allows for the second phase in developing competitive advantage, which consists of a systematic quantitative and qualitative screening approach once essential competitive resources are identified and ranked. Once a revised investible universe is created, it should flow into client asset allocation consistent with current suitability and fiduciary industry standards.

The foundations of competitive advantages can also be applied to drive practice management decision-making in the financial services industry. Intuitively, building a competitive advantage with a service orientation, focuses on “softer” assets as opposed to tangible plant, property, and equipment (PP&E). It is unlikely that FSPs will develop advantage with some form of unique office space, technology (i.e., IT infrastructure), or other physical assets. Rather, the dominant management logic suggests that advantage will stem from unique research insights (i.e., tacit firm knowledge) embedded in individuals or the institution, organizational culture, and institutional procedures for hiring and training at all levels of the firm. Solidifying the “portfolio” perspective will help decision-makers foster resource commitment (both time and money) to critical policies/procedures that have not traditionally been viewed as assets.



## Data Envelopment Analysis Foundations

Production functions are mathematical equations that estimate the quantity of production inputs (i.e., land and labor) necessary to produce a certain quantity of output (i.e., finished goods). Functions determine the maximum output for a given set of inputs or the minimum inputs for a given level of output. DEA utilizes a process that is similar to the linear programming optimization techniques, which produces single to multiple input/output efficiency measures (Banker *et al.*, 1984; Cook and Seiford, 2008).

DEA provides a new perspective of data that is not evident from other statistical methods. While traditional statistical methods like least-squares regression produce a line of best fit around the mean, DEA output provides efficiency scores of Decision-Making Units (DMU), relative to top performers in a sample (Charnes *et al.*, 1978). DEA reflects variation between DMUs, which measures the efficiency of individual branches, cost centers, divisions, firms, or industries. In the example that follows, individual firms are the DMUs, but there is a wide range of applications in which FSPs can consider alternative units of analysis (Sherman and Zhu, 2013).

FSPs compute relative efficiency scores across firms through return on assets (ROA) or return on equity (ROE) measures. ROA, for example, measures how efficiently a management team utilizes its assets to produce net income (an input/output measure: assets are the input and net income is the output). The commonly used Sharpe ratio also measures asset efficiency by standardizing returns over and above the risk-free rate with standard deviation (i.e., asset return less the risk-free rate divided by standard deviation), yielding a risk-adjusted excess return efficiency measure (Sharpe, 1964, 1966). Similarly, DEA produces output enabling plots of input/output ratios that illustrate efficiency scores across DMUs. DEA offers considerable flexibility in that it can build on this simple logic and accommodate multiple input and output measures simultaneously (Cook and Zhu, 2013).

To illustrate the output from DEA, consider a simple example drawing from 46 firms in the transportation industry in 2013. Table 1 shows the output from a slightly more complicated input/output model, which incorporates two inputs: 1) Total assets, 2) Invested capital (i.e., Debt and equity capital), and one output: Earnings before interest and taxes (EBIT). DEA uses a linear programming technique to produce theta scores that represent the optimal performers (i.e., firms with optimal EBIT) given the two inputs. In this example, Spirit and American Airlines have theta scores of one representing a tie in efficiency. All other firms are less than optimal in output and therefore have theta scores less than one. Analysts can then use these data in asset allocation models.

Table 1 – Transportation Industry Efficiency Scores \*

| Ticker | Firm Name                    | Rank | Theta | EBIT     | Total Assets | Invested Capital |
|--------|------------------------------|------|-------|----------|--------------|------------------|
| SAVE   | Spirit Airlines Inc          | 1    | 1.00  | \$ 283   | \$ 1,181     | \$ 771           |
| AMR1   | American Airlines Inc        | 1    | 1.00  | \$ 1,785 | \$ 25,612    | \$ 192           |
| CDHPF  | Hnz Group Inc                | 3    | 0.74  | \$ 62    | \$ 347       | \$ 277           |
| ALGT   | Allegiant Travel Co          | 4    | 0.73  | \$ 160   | \$ 930       | \$ 591           |
| SKAS   | Saker Aviation Services Inc  | 5    | 0.64  | \$ 1     | \$ 7         | \$ 4             |
| ASR    | Grupo Aeroportuario Sureste  | 6    | 0.63  | \$ 249   | \$ 1,635     | \$ 1,457         |
| CHRVF  | Chorus Aviation Inc          | 7    | 0.63  | \$ 134   | \$ 977       | \$ 560           |
| CPA    | Copa Holdings Sa             | 8    | 0.58  | \$ 549   | \$ 3,953     | \$ 2,815         |
| ALK    | Alaska Air Group Inc         | 9    | 0.57  | \$ 646   | \$ 5,838     | \$ 2,783         |
| VA     | Virgin America Inc           | 10   | 0.54  | \$ 81    | \$ 701       | \$ 385           |
| WJAFF  | Westjet Airlines Ltd         | 11   | 0.46  | \$ 408   | \$ 4,143     | \$ 2,279         |
| FDX    | Fedex Corp                   | 12   | 0.46  | \$ 3,446 | \$ 33,070    | \$ 20,013        |
| OMAB   | Grupo Aeroportuario Del Cent | 13   | 0.44  | \$ 89    | \$ 841       | \$ 715           |
| DAL    | Delta Air Lines Inc          | 14   | 0.41  | \$ 3,802 | \$ 52,252    | \$ 21,438        |
| AIRM   | Air Methods Corp             | 15   | 0.40  | \$ 121   | \$ 1,253     | \$ 984           |
| PAC    | Grupo Aeroportuario Del Paci | 16   | 0.39  | \$ 181   | \$ 1,927     | \$ 1,789         |
| PHIK   | Phi Inc                      | 17   | 0.37  | \$ 105   | \$ 1,173     | \$ 939           |
| LUV    | Southwest Airlines           | 18   | 0.36  | \$ 1,364 | \$ 19,345    | \$ 9,527         |
| AVH    | Avianca Holdings Sa          | 19   | 0.33  | \$ 385   | \$ 5,179     | \$ 3,166         |
| AAL    | American Airlines Group Inc  | 20   | 0.31  | \$ 1,935 | \$ 42,278    | \$ 12,622        |
| RYAAY  | Ryanair Holdings Plc         | 21   | 0.31  | \$ 906   | \$ 12,140    | \$ 8,130         |
| HA     | Hawaiian Holdings Inc        | 22   | 0.30  | \$ 134   | \$ 2,164     | \$ 1,141         |
| AIRT   | Air T Inc                    | 23   | 0.29  | \$ 3     | \$ 37        | \$ 27            |
| FDX1   | Federal Express Corp         | 24   | 0.29  | \$ 1,143 | \$ 19,964    | \$ 9,726         |
| UAL    | United Continental Hldgs Inc | 25   | 0.29  | \$ 1,769 | \$ 36,812    | \$ 13,908        |
| AIDEF  | Air Canada                   | 26   | 0.27  | \$ 359   | \$ 9,470     | \$ 2,562         |
| RJET   | Republic Airways Hldgs Inc   | 27   | 0.27  | \$ 212   | \$ 3,271     | \$ 2,441         |
| ATSG   | Air Transport Services Group | 28   | 0.27  | \$ 66    | \$ 1,033     | \$ 730           |
| JBLU   | Jetblue Airways Corp         | 29   | 0.27  | \$ 428   | \$ 7,350     | \$ 4,250         |
| GLUX   | Great Lakes Aviation Ltd     | 30   | 0.24  | \$ 4     | \$ 78        | \$ 39            |
| CGJTF  | Cargojet Inc                 | 31   | 0.24  | \$ 7     | \$ 116       | \$ 90            |
| BRS    | Bristow Group Inc            | 32   | 0.24  | \$ 191   | \$ 3,398     | \$ 2,606         |
| AAWW   | Atlas Air Worldwide Hldg Inc | 33   | 0.23  | \$ 206   | \$ 3,718     | \$ 2,861         |
| ICAGY  | Intl Consol Airlines Group   | 34   | 0.19  | \$ 980   | \$ 28,629    | \$ 12,058        |
| SKYW   | Skywest Inc                  | 35   | 0.15  | \$ 153   | \$ 4,233     | \$ 2,728         |
| VLRS   | Controladora Vuela Compania  | 36   | 0.15  | \$ 20    | \$ 640       | \$ 325           |
| EIFZF  | Exchange Income Corp         | 37   | 0.14  | \$ 32    | \$ 961       | \$ 740           |
| LFL    | Latam Airlines Group Sa      | 38   | 0.14  | \$ 678   | \$ 22,631    | \$ 13,130        |
| ERA    | Era Group Inc                | 39   | 0.13  | \$ 30    | \$ 959       | \$ 715           |
| GOL    | Gol Linhas Aereas Inteligent | 40   | 0.12  | \$ 119   | \$ 4,506     | \$ 2,697         |
| DLAKY  | Deutsche Lufthansa Ag        | 41   | 0.11  | \$ 712   | \$ 40,075    | \$ 15,062        |
| HELI   | Che Group Ltd                | 42   | 0.09  | \$ 65    | \$ 3,104     | \$ 2,175         |
| MIC    | Macquarie Infrastructure Cp  | 43   | 0.09  | \$ 52    | \$ 2,501     | \$ 1,986         |
| DCVRF  | Discovery Air Inc            | 44   | 0.05  | \$ 4     | \$ 300       | \$ 230           |
| AFLYY  | Air France - Klm             | 45   | 0.03  | \$ 179   | \$ 35,030    | \$ 15,000        |
| ZNH    | China Southern Airlines      | 46   | 0.02  | \$ 133   | \$ 27,290    | \$ 18,347        |

\* Theta scores based on DEA modeling in STATA range from 0 to 1.

## Why Should FSPs Embrace DEA?

DEA is a valuable tool for a number of reasons. First, it is an approach that is theoretically and statistically aligned with RBV and KBV logic, in that it highlights the top-performing firms on the efficient frontier, as opposed to regression analysis, which reflects central tendencies (Richard, *et al.* 2009). Second, DEA is an established methodology. DEA has a forty-year track record and "has emerged as a preeminent methodology for assessing the relative efficiency of decision-making units." (Fizel and D'Itri, 1999, p. 570) resulting in wide acceptance in fields such as tourism, supply-chain and logistics,



and finance. Scholars have written thousands of articles utilizing DEA methodology (Cook and Seiford, 2008) covering wide-ranging topics from marketing benchmarking (Donthu, Hershberger, and Osmonbekov, 2005), to sports management (Howard and Miller, 1993), to education (Mayston, 2003). Third, as mentioned previously, the input/output orientation of DEA is aligned with conventional analysis techniques already performed by FSPs. Managers and practitioners are already performing simplified ratios analysis consistent with the fundamental principles in DEA. Fourth, DEA is a readily-available tool. There are DEA applications in popular platforms like STATA, while there are DEA add-ins in Microsoft Excel through its solver applications as well. In addition, there is guidance that covers the nuances of running DEA models, as well as "how-to" instructions in popular texts frequently with accompanying CDs with datasets and code for running DEA applications. Finally, and perhaps most importantly, DEA offers an alternative to traditional performance measures such as the Sharpe ratio and Jensen's alpha, which is measured as portfolio return less market returns captured by the Capital Asset Pricing Model (CAPM) formula (Jensen, 1967). There is an extensive literature noting that Jensen's alpha suffers from benchmarking bias, while the Sharpe ratio omits transaction costs and fees (For a more detailed review of the limitations of the Sharpe ratio and Jensen's alpha see Murthi *et al.*, 1997). In short, DEA offers a complementary perspective, which helps advisors build customized portfolios reflecting idiosyncratic client objectives related to risk, return, or non-financial factors such as environment, social responsibility, and governance preferences (Abate *et al.*, 2021).

### How Can FSPs Apply DEA in Practice?

In addition to using DEA for individual stock selection, FSPs can utilize DEA during their evaluation of active mutual fund managers, hedge fund managers, and commodity trading advisors (CTAs), among others (Gregoriou and Zhu, 2005). While the application is consistent with the coding and graphing steps for individual stock analysis or firm-specific DMU examination, investment management efficiency analysis differs in its variable selection. As an example, consider applying DEA analysis to diligence efforts for hedge fund manager selection. In this case, managers do not have control of the underlying resource stocks at the company level but do control asset allocation decisions at the hedge fund portfolio level. As such, the variables in this type of application will be more aggregate measures such as monthly or yearly returns and fund standard deviation (i.e., risk). Nonetheless, the technique and analysis remain the same.

The input/output flexibility of DEA analysis contributes to a more nuanced understanding of an investment's performance (Murthi *et al.* 1997). Aggregate measures of performance like the Sharpe ratio and Jensen's alpha constrain the ability to examine additional factors that investors potentially value. For example, Basso and Funari (2001) showed that mutual fund rankings incorporating fund subscription costs and redemption fees, were different from traditional measures of performance like the Sharpe ratio. Since clients care most about performance, net of fees, analysis with additional inputs/outputs is significant. Other non-financial performance measures such as ESG are also relevant to investors (Bengo *et al.*, 2022). Abate *et al.* (2021) used DEA to rank mutual fund performance, complementing existing results utilizing alternative measures. In tangential research related to hedge funds, Kumar *et al.* (2010) demonstrated that hedge fund performance measured with DEA have a low correlation with performance measures like the Sharpe ratio, for example. Analysis with DEA rankings was "quite contradictory to the results given by the Sharpe ratio" (Kumar *et al.*, 2010: page 1753), because DEA allows for multiple input measures simultaneously. Since hedge fund managers have the freedom to use short-selling techniques, leverage, and derivatives (Nguyen-Thi-



Thanh, 2006) hedge funds can exhibit non-normal distributions, which aren't effectively captured in the Sharpe ratio. As such, these results suggest that applying DEA is complementary to other traditional measures of performance in the financial services industry.

Complementarity of measures in the financial services industry is paramount since alternative measures capture a broad range of factors that investors consider while making asset allocation decisions. While DEA analysis is not better or worse than traditional analytical tools, it does provide advisors with a framework for customizing client portfolios to incorporate specific client desires. As mentioned previously, DEA helps to elucidate the technical statistical differences between hedge funds and traditional long-only investments. The benefit of such analysis is not likely apparent to the average investor, but it does provide analytical support for complex asset allocation decisions of high net-worth individuals. DEA also contributes to the customization of client portfolios based on non-financial measures captured in the literature highlighting investor trends supporting ESG principles.

### Conclusion and Reflection

FSPs find themselves in a hypercompetitive environment reflecting the increasing sophistication of clients and competitors, as well as pressure from trading algorithms based on artificial intelligence applications. To compete more effectively, FSPs should seek to leverage fundamentally sound perspectives and tools from tangential fields such as management. Given the limited coverage of RBV, KBV, and DEA in the financial services literature, an opportunity exists for forward-thinking FSPs to apply management logic and DEA for asset selection and practice management. Success in this regard may stem from the first objective of this paper, which was that conceptualizing a firm as a portfolio of assets helps to focus attention on policies, procedures, and resources at the center of competitive advantage for individual firms. Success may also flow from this paper's second objective to promote the usage of DEA in the financial service industry. At a minimum, given the value of the presented management theory and DEA, FSPs should have a working knowledge of the fundamental logic, underlying assumptions, and potential uses in their respective domains. At a maximum, asset managers can conduct client specific DEA analysis to build customized client portfolios reflecting specific client needs.



## References

- Abate, G., Basile, I., & Ferrari, P. 2021, 'The level of sustainability and mutual fund performance in Europe: An empirical analysis using ESG rating', *Corporate Social Responsibility and Environmental Management*, vol. 28, no. 5, pp. 1446-1455.
- Andonova, V. & Ruiz-Pava, G., 2016, 'The role of industry factors and intangible assets in company performance in Colombia', *Journal of Business Research*, vol. 69, no. 10, pp. 4377-4384.
- Basso, A., & Funari, S. 2007, 'DEA models for ethical and non ethical mutual funds', *Mathematical Methods in Economics and Finance*, vol 2, pp. 21-40.
- Banker, R., Charnes, A. & Cooper, W., 1984, 'Models for estimating technical and scale inefficiencies in data envelopment analysis', *Management Science*, vol. 30, no. 9, pp. 1078-92.
- Barney, J. 1991, 'Special theory forum the resource-based model of the firm: origins, implications, and prospects', *Journal of management*, vol. 17, no. 1, pp. 97-98.
- Becker, G.S. 1964, 'Human Capital: A theoretical and empirical analysis, with special. Human Capital', in 3rd ed.) *The University of Chicago Press*.
- Bengo, I, Boni, L. & Sancino, A. 2022, 'EU financial regulations and social impact measurement practices: A comprehensive framework on finance for sustainable development', *Corporate Social Responsibility and Environmental Management*, Early Access Online.
- Brown, R. 2015, 'Strategic intent, capabilities and financial performance: A study of the pharmaceutical industry', *Journal of Management Policy and Practice*, vol. 16, no. 1, pp. 18-30.
- Brown, R. & Kline, W. 2020, 'Optimal misalignment: Strategic intent, organizational capabilities and performance', *Journal of Management Research*, vol. 20, no. 2, pp. 28-48.
- Charnes, A., Cooper, W.W., & Rhodes, E. 1978, 'Measuring the efficiency of decision making units', *European Journal of Operational Research*, vol. 2, no. 6, pp. 429-444.
- Cook, W. & Seiford, L., 2008, 'Data envelopment analysis: Thirty years on', *European Journal of Operations Research*, vol. 192, no. 1, pp. 1-17.
- Cook, W. & Zhu, J., 2013, *Data envelopment analysis: Balanced benchmarking*, Lexington Kentucky.
- Coff, R.W., 1999, 'When competitive advantage doesn't lead to performance: The resource-based view and stakeholder bargaining power', *Organization science*, vol. 10, no. 2, pp.119-133.
- Conner, K.R. 1991, 'A historical comparison of resource-based theory and five schools of thought within industrial organization economics: do we have a new theory of the firm?', *Journal of Management*, vol. 17, no. 1, pp.121-154.
- Curado, C. & Bontis, N., 2006, 'The knowledge-based view of the firm and its theoretical precursor', *International Journal of Learning and Intellectual Capital*, vol. 3, no. 3, pp. 367-381.
- Donthu, N., Hershberger, E., & Osmonbekov, T. 2005, 'Benchmarking marketing productivity using data envelopment analysis', *Journal of Business Research*, vol. 58, no. 11, pp. 1474-1482.



- Fizel, L., & D'Itri, P. 1999, 'Firing and hiring of managers: Does efficiency matter?', *Journal of Management*, vol. 25, pp. 567-585.
- Howard, L., & Miller, J. 1993, 'Fair pay for fair play: Estimating pay equity in professional baseball with data envelopment analysis', *Academy of Management Journal*, vol. 36, no.4, 882-894.
- Ghemawat, P., & Rivkin, J. 1998, 'Creating Competitive Advantage', *Harvard Business School Background Note* 798-062, January 1998. Revised February 2006.
- Grant, R.M., 1997. 'The knowledge-based view of the firm: implications for management practice', *Long Range Planning*, 30: 3, pp.450-454.
- Gregoriou, G. & Zhu, J., 2005, 'Evaluating hedge fund and CTA performance: Data envelopment analysis approach', John Wiley & Sons, Inc.
- Jensen, Michael C. 1967, 'Risk, the Pricing of Capital Assets, and Evaluation of Investment Portfolios'. Chicago, IL: University of Chicago.
- Kumar, U.D., Roy, A.B., Saranga, H. & Singal, K., 2010, 'Analysis of hedge fund strategies using slack-based DEA models', *Journal of the Operational Research Society*, vol. 61, no., 12, pp.1746-1760.
- Mayston, D. 2003, 'Measuring and managing educational performance', *Journal of the Operational Research Society*, vol. 54, no. 7: 679-691.
- Murthi, B. P. S. & Choi, Yoon K. & Desai, Preyas, 1997, 'Efficiency of mutual funds and portfolio performance measurement: A non-parametric approach', *European Journal of Operational Research*, Elsevier, vol. 98, no. 2, pages 408-418.
- Nguyen-Thi-Thanh, H., 2006, 'On the Use of Data Envelopment Analysis in Assessing Local and Global Performances of Hedge Funds', Working Paper.
- Penrose, E.T. 1959, 'The Theory of the Growth of the Firm', New York: John Wiley & Sons Inc.
- Peteraf, M. 1993, 'The cornerstones of competitive advantage: A resource-based view', *Strategic Management Journal*, vol. 14, no. 3, pp. 179-191.
- Porter, M.E. 1985, 'Competitive advantage. creating and sustaining superior performance', Free Press, New York.
- Richard, P.J., Devinney, T.M., Yip, G.S. & Johnson, G., 2009, 'Measuring organizational performance: Towards methodological best practice', *Journal of Management*, vol. 35, no. 3, pp.718-804.
- Sharpe, W., 1964, 'Capital asset prices: A theory of market equilibrium under conditions of risk', *Journal of Finance*, vol.,19, no. 3, pp. 425-442.
- Sharpe, W. 1966, 'Mutual fund performance', *Journal of Business*, vol. 34, no.1, pp. 119-138.
- Sherman, H.D., & Zhu, J., 2013, 'Analyzing performance in service organizations', *Sloan Management Review*, vol. 54, no. 4, pp. 36-42.
- Tomer, J.F. 1987, 'Organizational capital: The path to higher productivity and well-being', Praeger publishers.



Wernerfelt, B. 1984, 'A resource based view of the firm', *Strategic Management Journal*, vol. 5, no. 2, pp. 171-180.

Williamson, O. 1975, 'Markets and Hierarchies, Analysis and Antitrust Implications: A Study in the Economics of Internal Organization', *Free press, New York*

Winter, S.G. and Szulanski, G., 1999, 'Knowledge transfer within the firm: A replication perspective on internal stickiness', Working paper, Wharton, University of Pennsylvania. Presented at the 1999 Academy of Management conference.

Zane, L., & Kline, W. 2017, 'Competitive moves: The influence of industry context and individual cognitive factors. *Entrepreneurship Research Journal*, vol. 7, no. 1, pp. 1-30.