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Industry 4.0, Business Process Management, and Lean Six Sigma for Achieving Business Excellence through Operational Excellence

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Abstract

Background: Asset management organizations have integrated new technologies before, but this trend is expected to reach its peak in the coming years. Investors using technical instruments buy financial products from asset management companies (AMCs). Thus, AMC is working diligently to enhance its operations and processes, enabling investors to have seamless transaction experiences across its various platforms through simplified procedures and efficient management. **Objectives:** This study examines the performance drivers of AMCs, more specifically, how fundamental components contribute to business excellence by improving firm procedures and operations and creating new investor experiences. **Methods/Approach:** The report uses data from 387 asset management professionals from 10 businesses. In India, 10 prominent AMCs provided 387 valid replies to a work survey. The analysis was conducted using PLS-SEM. **Results:** The findings indicate that Industry 4.0, business process management, and Lean Six Sigma facilitate operational excellence and are key drivers of achieving business excellence in asset management firms in India. **Conclusions:** Organizations can achieve business excellence by applying concepts from Industry 4.0, business process management, Lean Six Sigma, and operational excellence. This is among the few empirical studies examining the enablers of business excellence in Indian AMCs.

Keywords: business excellence, operational excellence, asset management companies, business process management, Lean Six Sigma, Industry 4.0

JEL classification: G23, M11, M15, O32, O33
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Introduction

India's asset management industry has expanded rapidly in the last decade, prompting asset management companies (AMCs) to intensify process and technology initiatives to sustain service quality and scale. As a result of its rapid growth, AMCs are focusing on enhancing their business processes and leveraging technology to achieve operational excellence and deliver the best possible services to investors. A wide variety of financial institutions and businesses fall under the umbrella term AMCs (Dash & Mahakud, 2015). In India, asset management is mainly focused on mutual funds (Singh & Tandon, 2012; Chauhan et al., 2020). Mutual funds are crucial components of asset management organizations in India.

A steady stream of capital has been entering the mutual fund industry since May of 2014 (Spiegel & Zhang, 2013). Nearly 2,500 mutual fund products offered by 44 AMCs are available to Indian clients. According to various sources (Kale & Panchapagesan, 2012; Ramanujam & Bhuvaneswari, 2015; Savithri & Rajakumari, 2024; Majumdar & Chandra, 2025), investors are free to allocate their funds to AMCs operating in the mutual fund sector. Investors can invest their money directly in AMCs' portfolios online, following a 'Know Your Customer' process. Investors can do transactions with the banks with ease.

According to Dwivedi et al. (2021a), investors in both the public and private sectors can use banking and FinTech to conduct transactions more easily. This includes keeping tabs on various accounts, such as savings, stocks, mutual funds, IPOs, bonds, non-profit savings schemes, loans, health, life, and general insurance, through mobile banking applications. Investing in mutual funds has become much easier with the advent of dedicated smartphone apps. Investors can invest in a range of mutual funds offered by AMCs through mobile applications from investing firms like Groww, Zerodha Coin, ETMONEY, Kuvera, INDMONEY, PayTM Money, and others. These investment options have made it easier for more people to invest in AMCs and funds, enabling more individuals to reach their financial goals and retire comfortably. Financial institutions, asset management firms, the Indian government, the National Stock Exchange, the Mumbai Stock Exchange, the Securities and Exchange Board of India, and NGOs are all working to reassure Indians that their mutual funds are secure.

Among investing possibilities, mutual funds offer substantial benefits. India's young people's savings and investments are another consideration. Kids can get their hands on smartphones at a young age. Their knowledge of technology is extensive. Even as little children, they learn the value of working hard and saving money from their parents. As more and more young people enter the workforce, they have faith that the mutual funds they have invested heavily in will rise in value. Mobile apps will attract younger investors due to their accessibility, ease of use, and security. However, to achieve business excellence (BE), it is necessary to continually develop new technologies that simplify company procedures, deliver the best services to clients, and remain competitive.

The motivation for the research is to bridge the gap between theory and practice. While there is abundant theory in each domain, practitioners struggle with end-to-end implementation. The motivation is to develop a unified framework that articulates how Industry 4.0 technologies integrate into BPM lifecycles and Lean Six Sigma projects, resulting in OE and BE. Thus, the paper aims to investigate how AMCs can achieve BE to maintain their growth.

Dwivedi and Momaya (2003) state that to succeed in this rapidly growing industry, AMC companies must understand the market, respond quickly to changes in how people conduct business, and continually innovate to provide better services to their stakeholders and investors. This keeps a business successful by giving it an edge over

its competitors. The pursuit of long-term success and a distinct advantage over the competition is a need for all AMCs. However, the AMCs still face a formidable obstacle in their ongoing quest to innovate, keep pace with the ever-changing landscape of streaming business operations and technological advancements, and maintain their stellar reputation for investor service. Therefore, to achieve OE and, eventually, BE, it is crucial to combine Industry 4.0, BPM, and LSM. To help enterprises achieve both OE and BE, this study looks at Industry 4.0, BPM, and LSM. The goal of every AMC should be to be the best at what they do. The company can achieve its BE goal by focusing on Operational Excellence. The primary goal of this research is to catalogue the elements that contribute to the OE and BE, which are crucial to the success of AMCs in India. After the introduction, a literature review has been conducted and a conceptual framework developed. The third part focuses on the research methodology, followed by the results, discussion, and conclusion.

Literature Review

When AMCs focus on operational excellence, they can reach BE. Lean Six Sigma (LSM), Industry 4.0, and Business Process Management (BPM) are the three main components of Operational Excellence (OE). Organizations need to optimize, coordinate, and leverage all three aspects to achieve operational OE. Industry 4.0, BPM, and LSM serve as the starting points for the study, which is then extended to OE and BE.

Industry 4.0

Industry 4.0 is a model that incorporates recent technological advancements into a comprehensive system. It utilizes foundational technologies such as Big Data, Internet of Things (IoT), Cloud services, Analytics, and blockchains to provide real-time data for industrial and service systems to analyze (Luftman et al., 2015; Dalenogare et al., 2018; Pejić Bach et al., 2023). Because of the nature of financial and money-related transactions, AMCs employ Industry 4.0 technologies. To improve the responsiveness and efficiency of industrial systems, AMC aims to provide the best possible smooth services. There is a wide variety of industrial uses for Industry 4.0. Nevertheless, there is a lack of documentation on the application of Industry 4.0 in the service sector, particularly in financial services (Dwivedi et al., 2021a; Dwivedi et al., 2021b). IoT connects anything to the internet for information exchange via sensing devices (Chiarini & Kumar, 2021; Urban & Irsa, 2023). Financial and AMC interconnectivity can improve business operations. ERP systems communicate with manufacturing floor control, supervisory control, and data acquisition via real-time shop-floor information software (MES/SCADA) (Tsipoulanidis & Nanos, 2022). Big Data is enormous, diverse, and fast data from numerous networks. Businesses can analyze vast amounts of data with business intelligence and decision support systems (Wang et al., 2018). AI lets machines execute human tasks. Machine learning uses data to create decisions and predictions (Reinhard et al., 2016). Cloud computing delivers internet-based services. These services are usually software, hardware, and platforms (Chiarini & Kumar, 2021). Layer-by-layer deposition or fusion produces 3D objects. Manufacturing machines and processes with sensors measure, analyze, and activate other processes. Cobot is a worker-interactive robot. A shared workstation or autonomous shop floor movement is possible for the robot (Djuric, Urbanic, & Rickli, 2016). Users can improve their skills with smart devices such as displays, 3D glasses, and exoskeletons (Reinhard et al., 2016). Data sent online is unsafe. Cybersecurity safeguards data (Chouhan et al., 2017). System simulations assess situations. Faster design, evaluation, and implementation of cost-effective solutions reduces time-to-market (Chouhan et al., 2017). Manufacturing

industries employ these technologies more, but financial services businesses are starting to use them. When implemented correctly, it may transform AMC's business processes and operations. Two hypotheses are formulated:

- H1: Industry 4.0 practices are significant contributors to Business Process Management.
- H2: Industry 4.0 practices are significant contributors to LSM.

Business Process Management

By focusing on managing and improving process outcomes, process-oriented organizations aim to increase performance, productivity, return on investment (ROI), and customer satisfaction (Bhat et al., 2015; Bhasin, 2011). A more modern and practical approach to managing a company's operations is to view it as an interconnected web of processes that traverse its many levels and boundaries (Van Looy, 2019; vom Brocke & Mendling, 2018; Amaral et al., 2022).

According to Jennings et al. (2000), business processes can either be temporary or permanent. When necessary, temporary procedures begin and end at a later time. Processes that are permanent run continuously. Organizational procedures, as defined by Dumas et al. (2018), are actions that are either logically connected or event-driven and coordinated in real time. To achieve strategic objectives or satisfy customer demands, businesses develop processes. Businesses can implement either cross-functional or unit-based processes. According to Ho et al. (2009) and Suša Vugec et al. (2019), process-oriented organizations can benefit from BPM in terms of efficiency and effectiveness. To implement BPM, organizations must consider six key areas: Strategy Alignment, Governance, Methods, Information Technology, People, and Culture (vom Brocke et al., 2014; Dalaqmeh & Irsa, 2022). Following these six guidelines will ensure a successful BPM installation.

Strategic alignment, Governance, Methods, IT, People, and Culture are the six pillars upon which BPM rests (Rosemann & vom Brocke, 2015). For financial services AMCs, each component offers unique opportunities for growth and strategic development. Achieving strategic alignment requires a top-down commitment to enhance processes, link strategy to process capabilities, construct an enterprise process architecture, assess processes, and engage process owners, customers, and stakeholders strategically. In process management, governance specifies the procedures for decision-making, assigning responsibilities, establishing process standards, and measuring performance against those criteria (Luftman et al., 2015). Process management, process improvement and innovation, process monitoring and control, process execution and implementation, and process design modeling are all part of the methods' purview.

The role of Information technology within the framework is to provide up-to-date information on all aspects of process management and to optimize and facilitate processes, governance, and strategy. Competence in processes, knowledge of process management, appropriate process education, capacity for process-based collaboration and teamwork, and process-management leadership qualities are all aspects of the people key area. The cultural key area of business process management includes leadership's emphasis on processes, process-related values and beliefs, process-related behaviors and attitudes, and process-related social networks. Based on the above, the hypothesis has been defined:

- H3: Business Process Management has a significant impact on OE.
- H4: Business Process Management has a significant impact on BE.

Lean Six Sigma

According to several studies (Adebanjo et al., 2016; Albliwi et al., 2014; Antony et al., 2007; Belhadi et al., 2020; Ashok Sarkar et al., 2013), LSM enhances process performance, customer satisfaction, and bottom-line results. LSM is an emerging paradigm in the financial services industry. Unlike other financial services, mutual fund AMCs have not conducted empirical research on LSM. An AMC administers trust-based mutual funds. Mutual fund investments have been on the rise due to government initiatives. To achieve OE, AMC management needs to enhance the efficiency and effectiveness of its processes, which can be achieved by implementing the LSM methodology. By enhancing services and product innovations, LSM maximizes stakeholder value by improving quality, agility, speed, cost, and customer happiness (Dwivedi et al., 2021a). It achieves this by integrating various lean and Six Sigma techniques. Many businesses worldwide have followed in the footsteps of GE and Motorola, leading to their widespread adoption in both the industrial and service sectors (Laureani and Antony, 2012 and 2017).

According to Womack and Jones (1996), the lean methodology entails the following: value specification, a sequence of value-creating processes, interruption-free execution of operations upon request, and increased productivity and quality. By aligning more closely with consumer desires, lean thinking enables the optimization of resources – labor, equipment, time, and space – resulting in an efficient process. To ensure process quality and efficacy, Six Sigma is a corporate strategy that focuses on customer-critical outputs to identify and eliminate the sources of errors, faults, or failures in business processes, according to Snee (2010).

Lean is better suited to short-term, simple improvements, while Six Sigma is better suited to complex, long-term problems for which no known solution exists (Antony et al., 2018). Lean requires minimal expenditure, whereas Six Sigma issues require substantial funding. Statistical approaches are essential to Six Sigma for understanding problem severity and reducing variability; however, Lean relies less on them. Lean investigates end-to-end process mapping and employs value stream activities to comprehend process interaction. However, Lean does not look into the quality (efficacy) of the process. While a typical Six Sigma problem-solving scenario focuses on improving process quality, it fails to account for system interactions across processes, potentially leading to suboptimal overall process performance. Due to apparent shortcomings in these methods when applied individually, organizations prefer an integrated LSM approach to achieve both efficiency and efficacy. The following hypotheses are defined as follows:

- H5: LSM has a significant impact on OE.
- H6: LSM has a significant impact on BE.

Operational Excellence

Hammer (2004) defines better performance with current operational approaches as OE (Operational Excellence). To preserve the basic techniques for task completion while minimizing errors, expenditures, and delays, it is necessary to execute tasks accurately across every aspect of the business. Accurate tasks represent the pinnacle of excellence. With this definition, any effort to enhance operations is considered OE. When businesses take steps to improve their operations to gain a competitive advantage, they engage in OE. Not only are the needs of stakeholders and customers taken into consideration, but also the optimization of organizational advantages. Carvalho et al. (2019), Bhullar et al. (2014), and Found et al. (2018) are only a few examples of the many academic efforts to develop OE models.

A single best OE model is required, despite the existence of many (Carvalho et al., 2019). The question of how long OE's advantages will last is a major one. Although certain businesses have achieved success by adopting OE strategies, these efforts alone cannot guarantee continued competitiveness. There has been very little research on how to develop an OE model that can endure and continue to benefit the company (Carvalho et al., 2019; El Dardery et al., 2023; Shamsuzzoha & Jaakkola, 2024).

In their pursuit of OE, organizations are employing a wide variety of improvement initiatives. Nevertheless, we emphasized this in order to create an OE Model that integrates BPM, LSM, and Industry 4.0. To develop a long-term OE model, we investigate the interconnections between various factors. To achieve business success, we focus our efforts on OE activities within AMCs. The following hypothesis has been defined:

- H7: OE significantly impacts BE.

Business Excellence

To achieve BE, a company must strengthen its management processes and procedures to improve performance and benefit stakeholders. Implementing a quality system is just one small part of what it means to have an excellent business. Achieving excellence in all aspects of an organization – including strategy, leadership, personnel, information management, and procedures – with a primary focus on producing outstanding business results is what we mean by BE (Dahlgaard et al., 2013; Almeida et al., 2022). Exemplary management practices and the successful completion of organizational goals are typical hallmarks of businesses that have achieved the highest levels of excellence (Castilla & Ruiz, 2008). When applied internally, BE models provide a foundation for a more systematic, organized approach to thinking and doing, thereby enhancing performance. All parts and dimensions of a company, especially those that affect performance, are considered in the exhaustive models. These models are well-known worldwide for providing a structure that helps businesses implement BE principles and for tracking the impact of this implementation (Dahlgaard et al., 2013). A framework that lays out a means for firms to achieve their goals and effectively handle everyday obstacles is the European Foundation for Quality Management (EFQM) BE Model. Additionally, it provides a framework for companies to identify areas for improvement, enabling them to continue performing well.

Several authors provide relevant literature on this topic (Bocoya-Maline et al., 2024; Calvo-Mora et al., 2015; Criado-García et al., 2019; Fonseca, 2022; EFQM, 2025). The model highlights the company's ability to provide outstanding goods or services to its customers or other interested parties. The EFQM approach does not support rigid reliance on a predetermined list of requirements. Any company can achieve BE by following its thorough and consistent set of principles (EFQM, 2025).

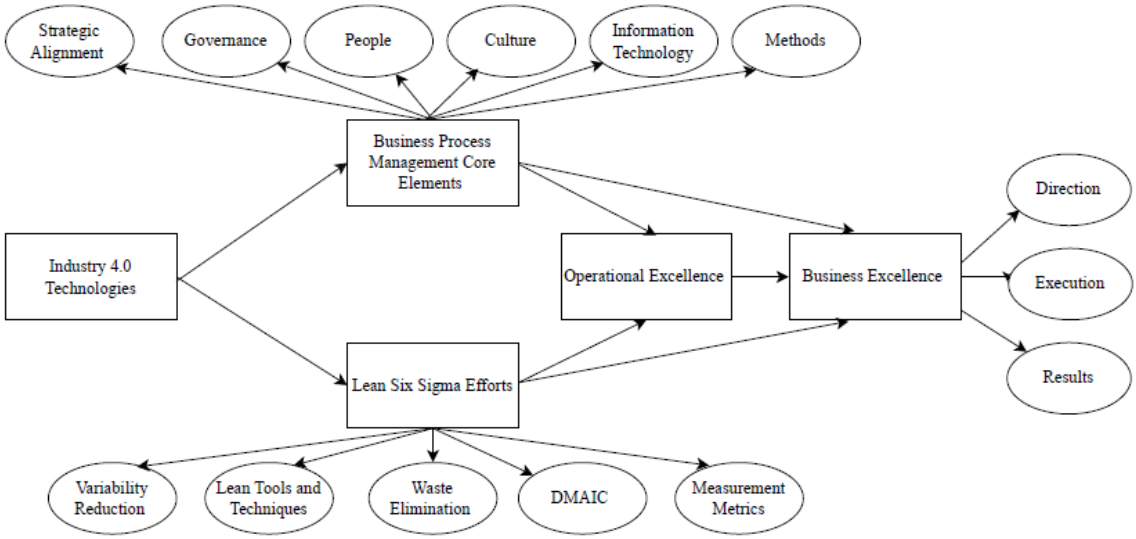
Due to its strategic framework, the EFQM model is well-suited for assessing a company's long-term goals, as it emphasizes operational performance and is result-oriented. Briš and Urbanek (2024) cite EFQM in their work. When applied to a business, the EFQM model provides a holistic view that accounts for the fact that the company is more like a complex system than a simple machine. Three sets of persuasive yet straightforward questions form the basis of the EFQM Model's framework: Direction, Execution, and Results (EFQM, 2025).

Research Methodology

Research Model

Automation in AMCs is one way that Industry 4.0 helps to improve business operations; other ways include LSM, which focuses on efficiency and effectiveness. Industry 4.0 is a first-order variable that is measured by five determinants. One factor that affects BE is BPM, a second-order variable that depends on six first-order variables: strategy alignment, governance, methods, IT, people, and culture. Four determinants measure strategic alignment, four measure governance, five measure methods, three measure information technology, four measure people, and four measure culture as first-order variables. Figure 1 presents the research model.

Figure 1
Research Model



Source: Authors' work

Among the factors influencing BE is LSM. LSM is a second-order variable that has five sub-variables. First-order variables include LSM tools and techniques, Waste elimination, DMAIC methodology (define-measure-analyze-improve-control), Variability reduction, and Measurement metrics; second-order variables include LSM. Four determinants measure LSM tools and techniques, four measure Waste elimination, three measure DMAIC methodology, three measure Variability reduction, and four measure Measurement metrics.

OE is a factor that can affect BE levels. Seven factors determine OE, making it a first-order variable.

BE, which is being assessed here, is the dependent variable. BE is a variable of the second order, with three first-order sub-variables: Direction, Execution, and Results. With five determinants each for direction, execution, and results, we have a complete set of first-order variables.

Research instrument

The research instrument was developed through a literature review and consultations with industry experts. The instrument represents constructs of the Industry 4.0, BPM, LSM, OE, and BE using a five-point Likert scale (Yoshikuni et al., 2024). Table 1 lists the constructs. The survey questionnaire used a five-point Likert scale, widely recognized as one of the most frequently used and trustworthy scales. Likert scales analyze respondents' perceptions of the constructs in a questionnaire using a collection of items. Likert scales analyze responses in an ordinal fashion, with numbers representing rank order. The results reflect respondents' perspectives on the provided voice input, with possible replies including 'Strongly disagree', 'Disagree', 'Neutral', 'Agree', and 'Strongly agree'.

The study adopted second-order constructs, i.e., BPM and LSM. Six first-order constructs were used for the measurement of BPM, whereas five constructs were used for the measurement of LSM. Rosemann and vom Brocke (2015) highlighted the six most important elements of BPM (Strategic Alignment, Governance, Methods, Information Technology, People, and Culture). The second-order constructs of LSM were adopted from Belhadi et al. (2020). The authors identified five constructs to measure LSM efforts (Variability Reduction, DMAIC Methodology, Waste Elimination, LSM Tools and Techniques, and Measurement Metrics). IN and OE are standalone constructs. The measures of BE were adopted from the EFQM Model (2025). The EFQM model comprehends three different dimensions: Direction (Why), Execution (How), and Results (What).

Table 1
Research framework constructs

Constructs	Code	Indicators
	Independent constructs	
Business Process Management	SA	Strategic Alignment
	G	Governance
	M	Methods
	IT	Information Technology
	P	People
	C	Culture
Lean Six Sigma	VR	Variability Reduction
	LST	Lean Six Sigma tools & techniques
	WE	Waste Elimination
	DM	DMAIC Methodology
	MM	Measurement Metrics
Industry 4.0	IN	Industry 4.0
Operational Excellence	OE	Operational Excellence
	Dependent construct	
Business Excellence	D	Direction
	E	Execution
	R	Results

Source: Authors' work

The questionnaire and essential aspects of the study were pre-tested with professionals and industry specialists. The researcher consulted subject-matter experts possessing the necessary experience and authority in OE and BE to gather their feedback on potential modifications to the questionnaire, the possible exclusion of indicators, and additional recommendations concerning respondent categories. The

recommendations derived from the pilot and primary surveys were integrated into the questionnaire.

Sample Description

Given the scarcity of research on factors affecting BE in AMCs, this study adopts a descriptive, empirical, and exploratory approach. The research has been based on the purposive sampling method, concentrating solely on employees of Indian AMCs working in mutual funds and who are involved in OE and BE efforts within their organizations.

This study investigates the issue within the framework of AMCs in India. Therefore, the sample consists of 387, including both the pilot study sample and the main sample. The pilot study involved 120 respondents and aimed to assess the viability of the proposed methodology for the main investigation, evaluate the instrument, and verify the validity and reliability of the foundational model, thereby enhancing its specification prior to the main study. The main study surveyed a total of 267 respondents from Mutual Fund AMCs across the following respondent classes: Operations Managers, Process Improvement Managers, team members of OE and BE departments, and LSM Black Belts. Only organizations with prior experience in undertaking OE or BE initiatives were included. The target population was the employees of Mutual Fund organizations involved in the excellence projects.

There are 44 Mutual AMCs in India. Ten were selected as a part of this study. The rationale for selecting these companies is their contribution to the total Assets under Management (AUM) in Mutual Funds in India. They account for 60% of total investments in Mutual Fund Schemes in India by retail and institutional investors. The Organizations considered for Study are Aditya Birla MF, Axis MF, DSP MF, Edelweiss MF, HDFC MF, ICICI MF, Kotak Mahindra MF, Nippon India MF, SBI MF, and UTI MF.

Ethical considerations were prioritized throughout the study, with explicit consent obtained from all participants. Respondents were informed about the survey and the study's objectives, and they were thanked for their cooperation. The researcher addressed all inquiries from respondents while ensuring complete anonymity and confidentiality.

Statistical methods

Several statistical methods were employed in a multi-stage analysis of the survey data collected from the questionnaire. We first conducted a validity study to ensure the research tools were reliable. To ensure content validity, we used items obtained from the literature and conducted a pilot study. Furthermore, to assess convergent validity and uncover the fundamental structure of a vast number of variables, Hair et al. (2019) employed explanatory factor analysis (Osborne et al., 2008). Any given indicator may be associated with any given factor; this a priori assumption underpinned the usage of these variables. We employed confirmatory factor analysis to assess discriminant validity, defined as the ability to differentiate among constructs, as measured by the degree to which latent-variable measures are distinct (Osborne et al., 2008; Hernaus et al., 2012). The computation of Cronbach's alpha coefficients, which assess the internal consistency of the items used to construct the scales, was the second stage in analyzing the items' dependability (Hair et al., 2019). Third, we conducted descriptive and nonparametric correlation analyses of the primary data to ensure data validity (Hair et al., 2019). Step four involved testing the fit of the structural equations model using the fit indices proposed by Henseler (2017). Using a bootstrapping process with 5,000 resamples, we calculated the statistical significance

of the estimations (t-values). Data Analysis was performed using partial least structural equation modelling (PLS–SEM) with ADANCO software.

Validity

We ensured the study instruments were valid before conducting the multivariate analysis. We examined content validity, convergent validity, and discriminant validity, which are three key aspects of construct validity. We achieved content validity by modifying items based on our prior research and the literature. We interviewed 10 managers as a pilot to determine if we could anticipate a satisfactory level of understanding. Several in-depth interviews led to the implementation of specific adjustments.

Results

Measurement Model

The validity and reliability of the scale were assessed through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Preliminary diagnostics confirmed the suitability of the dataset (N = 387): the Kaiser–Meyer–Olkin (KMO) index was 0.80, exceeding the recommended minimum of 0.50, and Bartlett's test of sphericity was significant ($p < .05$). These results indicate that assumptions of normality, linearity, and homoscedasticity were not violated (Hair et al., 2019; Yoshikuni et al., 2024).

EFA revealed strong factor loadings, ranging from 0.683 to 0.937, all above the suggested threshold of 0.70 (Hair et al., 2019). Convergent validity was supported, as average variance extracted (AVE) values ranged between 0.528 and 0.821, exceeding the minimum threshold of 0.50, while Cronbach's a coefficients were consistently greater than 0.70, confirming internal consistency (Hair et al., 2019).

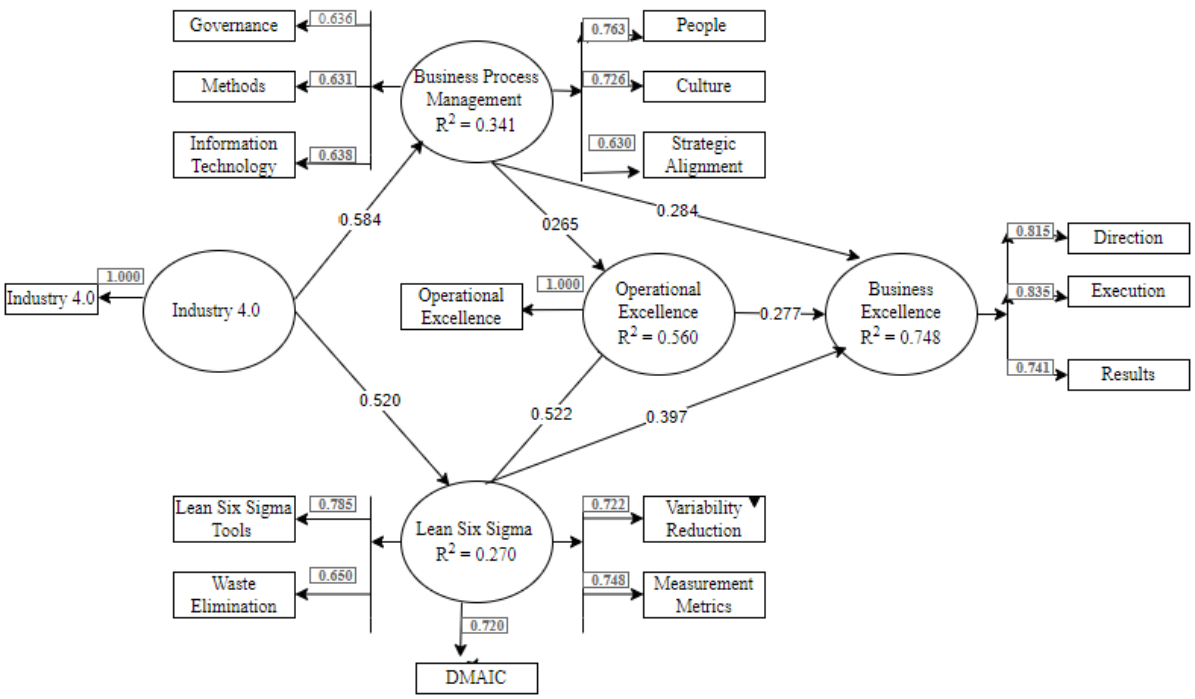
Discriminant validity was assessed using the Fornell–Larcker criterion (Fornell & Larcker, 1981). For each construct, the square root of its AVE exceeded the corresponding inter-construct correlations, providing clear evidence of discriminant validity.

Additional diagnostic checks confirmed the absence of response bias, missing values or outliers, multicollinearity, and problematic cross-loadings. Overall, the findings demonstrate that the measurement model possesses robust reliability and validity at both the first- and second-order construct levels.

PLS-SEM Model

The PLS-SEM model was estimated using ADANCO, and the results are shown in Figure 2. All independent variables had significant direct effects on the dependent construct in the second-order model. In addition, six significant mediating effects were identified, including a significant indirect effect (bootstrapped). Overall, the model explained 74.8% of the variance in BE, indicating strong predictive power. A summary of the direct and indirect effects is presented in Tables 2 and 3.

Figure 2
Second-order PLS-SEM model



Source: Authors' work

Direct Effects

Table 2 shows the results for direct relationships between constructs. Industry 4.0 significantly influenced both LSM (β = 0.520, $p < .01$) and BPM (β = 0.584, $p < .01$). LSM had strong positive effects on OE (β = 0.522, $p < .01$) and BE (β = 0.397, $p < .01$). OE further contributed to BE (β = 0.277, $p < .01$). Similarly, BPM significantly predicted both OE (β = 0.265, $p < .01$) and BE (β = 0.284, $p < .01$).

Table 2
Direct Effects

Relationship	Beta Value	T value	Level of Significance	Result
IN -> LSM	0.520	8.586	p<0.01	Supported
IN -> BPM	0.584	11.269	p<0.01	Supported
LSM -> OE	0.522	7.324	p<0.01	Supported
LSM -> BE	0.397	7.233	p<0.01	Supported
OE -> BE	0.277	5.989	p<0.01	Supported
BPM -> OE	0.265	4.0167	p<0.01	Supported
BPM -> BE	0.284	5.385	p<0.01	Supported

Note: Bootstrapping (5,000 resamples); p<.01 for all reported paths.
Source: Authors' work

Indirect Effects

Table 3 summarizes the mediating relationships. Industry 4.0 exerted indirect effects on both OE and BE through BPM and LSM, all of which were significant and indicated

complete mediation. Furthermore, BPM and LSM influenced BE indirectly through OE, indicating partial mediation.

Table 3
Indirect Effects

Relationship	Beta Value	T value	Level of Significance	Result	Mediation
IN -> BPM --> OE	0.584*0.265 =0.155	5.391	p<0.01	Supported	Full
IN -> LSM --> OE	0.520*0.522 =0.272	9.461	p<0.01	Supported	Full
IN -> BPM --> BE	0.584*0.284 =0.166	5.804	p<0.01	Supported	Full
IN -> LSM --> BE	0.520*0.397 =0.206	7.203	p<0.01	Supported	Full
BPM --> OE --> BE	0.265*0.277 =0.073	3.434	p<0.01	Supported	Partial
LSM --> OE --> BE	0.522*0.277 =0.145	4.405	p<0.01	Supported	Partial

Note: Bootstrapping (5,000 resamples); $p<0.01$ for all reported paths.
Source: Authors' work

These findings support the hypothesized model and confirm that Industry 4.0, BPM, and LSM jointly drive OE and BE.

Discussion

Summary of research

The research focused on two independent first-order variables, OE and Industry 4.0, and three second-order variables, BPM, LSM, and BE. BE in Indian Mutual Fund AMCs was the dependent variable, and the researchers examined the effect of each independent variable on it. We employed PLS, an SEM technique, and ADANCO software to conduct statistical tests on the model we had developed. Henseler (2017) states that a coefficient of determination of 0.67 indicates substantial predictive power for the model. Our model has a significant coefficient of determination of 0.748 for the dependent variable BE. Therefore, the conceptual model proposed in our research model has been validated in the AMCs context.

Theoretical contributions

The research contribution is to enhance the BE practices of mutual fund AMCs. Both the academic community and specific Indian enterprises benefited from the researcher's investigation of relevant components and their effects on BE in this field. What follows is an explanation of how this study adds to the existing body of knowledge on BE as well as its practical applications.

The researcher found a limited amount of literature on BE in the mutual fund industry. The banking and insurance industries are the backbone of the academic literature on financial services. As the first study of its kind, this research aims to assess BE capacity among mutual fund AMCs. Furthermore, academic theories examine the impact of individual constructs (e.g., BPM, LSM, and IN) on achieving both OE and BE, as well as on the transition from operational to BE.

This study stands out because it experimentally tests the effects of three independent constructs – BPM, LSM, and Industry 4.0 – on OE and BE in AMCs. To our

knowledge, this is the first empirical study to examine this topic. The research also examines the mutual fund industry's use of all three OE-related concepts. We established three important drivers (I 4.0, BPM, LSM) for achieving BE.

The researcher reviewed relevant literature published between 1995 and 2024 to evaluate the gaps critically. A theoretical framework was developed using the identified constructs, and research gaps were identified and then addressed. The literature evaluation is therefore a significant contribution to this research. While many articles have been written on BE in general, the researcher did not find any studies that examine achieving BE in Mutual Fund AMCs in India by leveraging the factors covered in this study.

Practical implications

Supported by the literature and the analysis of the collected data, the study developed a model that the MF organizations can use as a guiding tool. In addition, MF organizations can use the recommendations below to achieve BE.

In the Financial Services sector, LSM initiatives have been implemented primarily in the Banking & Insurance industry. Very few mutual fund AMCs implement LSM to achieve OE and BE. This study empirically demonstrated that LSM can help achieve OE & BE in the MF organization. Every MF organization should consider deploying LSM initiatives to achieve OE & BE.

In the Financial Services sector, BPM initiatives have been primarily implemented in the banking and insurance industries. Very few mutual fund AMCs have robust BPM systems to achieve OE and BE. This study empirically demonstrated that BPM can help achieve OE & BE in the MF organization. Every MF organization should consider strengthening its BPM systems to achieve OE & BE.

All organizations in the Financial Services Sector, including MF AMCs, have adopted Industry 4.0 to deliver competitive services to their investors. However, Industry 4.0 has not been implemented yet in BPM systems and LSM initiatives for deployment and execution. Some Industry 4.0 technologies can be integrated with BPM and LSM initiatives to enable seamless deployment and execution.

An integrated approach to LSM, BPM, and INDUSTRY 4.0 should be considered, as it will lead to OE and ultimately to BE.

Limitations of the Study

The study had certain limitations and, as mentioned previously, a need for future research, but it did contribute to theory, the research community, and the business world. This section presents the constraints. Only mutual fund AMCs based in India were considered for this research.

For this literature review, we employed a strict timeframe of 1995–2024 to identify publications published in English-language journals, accessed through databases such as ProQuest Direct and EBSCOhost. As a result, important journal papers may be omitted.

We employed a cross-sectional design and quantitative analysis within our positivist research approach. Within the allotted period, this research methodology proved most suitable for exploring the research objectives. The findings supported the theory, benefited the research community, and aided the commercial sector. It is possible to conduct in-depth analyses using alternative methods and designs.

Only 10 Indian MF AMCs participated in the survey. This suggests that some individuals with extensive knowledge may have been unable to participate in the study because they lacked affiliation with the groups.

Scope of Further Research

Given the constraints mentioned earlier, there are a few ways this study might be extended: using other databases to examine the literature, and future research could include more industries and areas. Publications in other languages may also be considered for review. By incorporating a qualitative case study technique alongside the quantitative methods, the results could have been richer and more detailed. A longitudinal study design would be ideal for this type of investigation. Given the numerous factors contributing to instability in the financial services market, researchers may want to revisit this study. Surveys in different AMC groups that were not initially part of the study could be included in future research.

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