



Afzal¹, Dr. Eruj Wajidi Rehan² & Dr. Muhammad Haris Mirza³

¹Assistant Admin Officer, Institute of Health & Business Management, Jinnah Sindh Medical University.

²Lecturer, Institute of Health and Business Management, Jinnah Sindh Medical University.

³Assistant Professor, Department of Business Administration, Federal Urdu University of Arts, Science and Technology.

KEYWORDS	ABSTRACT
Business Process Reengineering (BPR); Government Regulations; Organizational Culture; Organizational Readiness for Change; Business Strategy; Management Commitment; PLS-SEM; Manufacturing Sector, Pakistan	This study examines how internal and external factors affect the success of Business Process Reengineering (BPR) implementation in Pakistan's manufacturing sector, introducing two previously under examined predictors – organizational culture and government regulations – alongside the mediating roles of organizational readiness for change and business strategy, and the moderating role of management commitment. Following a post-positivist, deductive, quantitative design, survey data were collected from 302 managerial-level respondents in manufacturing organizations across Pakistan using a 43-item instrument adapted from established scales. After data screening (list wise deletion of incomplete responses and removal of straight-line responses), 289 valid responses were retained for analysis. Because Mardia's test confirmed significant multivariate non-normality and the model combines reflective measures with conceptually formative-leaning composites, Partial Least Squares Structural Equation Modelling (PLS-SEM) was used, with 1,000-sample bootstrapping to test path significance. The results show that organizational culture had a significant positive direct effect on BPR implementation and a significant positive indirect effect through organizational readiness for change (partial complementary mediation). Government regulation showed a significant positive indirect effect on BPR implementation through business strategy, but a significant negative direct effect, such that the two effects offset one another – a suppression pattern indicating that regulatory pressure only translates into successful reengineering outcomes when it is actively metabolized into strategic action. Management commitment had a strong positive direct effect on BPR implementation but did not significantly moderate the relationship between organizational readiness for change and implementation success. The structural model explained 54.0% of the variance in BPR implementation. These findings refine the theoretical understanding of how internal culture and external regulation jointly shape reengineering outcomes and offer concrete guidance for manufacturing firms designing BPR initiatives under regulatory constraint.
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Corresponding Author	Dr. Muhammad Haris Mirza
Email:	mharis.mirza@fuuast.edu.pk
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Introduction

Business Process Reengineering (BPR) is among the leading continuous-improvement methodologies used for change management, overhauling business processes, and addressing economic and supply-chain challenges (Farrell, 1994). Extensive research has sought to identify and develop critical success factors that ease BPR implementation (Fetais et al., 2022; Omid & Khoshtinat, 2016). While this literature has yielded promising insights, most of it is geared toward internal improvement and stability; comparatively few studies have considered the practical implications of external factors that threaten the success or failure of a BPR project (Fetais et al., 2022).

This study develops and empirically tests new critical success factors affecting BPR implementation from both an internal and an external vantage point, so that appropriate counter-strategies can be designed. Two success factors that have received little prior attention – Government Regulations (Wicaksana Siregar, 2021) and Organizational Culture (Omid & Khoshtinat, 2016) – are the focus of this study, together with the roles they play in shaping how BPR project life cycles unfold inside and outside the firm. Alongside these main factors, the indirect relationships carried through Organizational Readiness for Change (Hashem, 2020) and Business Strategy (Sikdar & Payyazhi, 2014) are also analyzed to understand how they work in tandem with this new research direction.

Across multiple prior studies, external influence particularly the impact of government policy on corporations – has largely gone unaddressed (Carmo Caccia-Bava et al., 2013; Fetais et al., 2022; Abdolvand et al., 2008); these studies focused almost exclusively on improving internal mechanisms, leaving open the question of how external regulatory factors affect the day-to-day operational workings of a company and its longer-term strategic choices, such as business overhaul or expansion. The study was guided by the following research questions:

- RQ1: To what extent do Government Regulations affect a company's business process reengineering practices?
- RQ2: Does Business Strategy matter during a BPR project when considering the impact of governmental regulations?
- RQ3: How does Organizational Culture affect BPR Implementation through Organizational Readiness for Change?

These questions were addressed through quantitative statistical analysis intended to (i) quantify the impact of Government Regulations on BPR Implementation, (ii) establish the importance of Business Strategy while implementing BPR, and (iii) quantify how Organizational Culture affects BPR Implementation. The study is scoped to the manufacturing sector of Pakistan and the managerial staff currently employed within it, a sector in which continuous-improvement

methodologies – Lean Six Sigma, Industry 4.0, and Business Process Reengineering alike – are pursued with practical urgency amid intense competitive pressure.

Literature Review

Michael Hammer first championed the use of cross-functional innovation to increase productivity and reduce overhead costs (Hammer, 1990). He proposed that for companies to excel at streamlining their business processes, a wholesale overhaul of those processes was required – what he termed business process reengineering (BPR) – and that achieving BPR required breaking away from traditional, incremental innovation and adopting a culture of discontinuous thinking.

BPR implementation success has multiple dimensions, and a substantial body of research has sought to identify and codify the relevant success factors. Among these, management commitment, business strategy (Farrell, 1994), and readiness for change (Hashem, 2020) have been studied extensively. Fetais et al. (2022), in a literature review of BPR success factors, noted that despite the volume of prior work, the subjective nature of many studies and the continually evolving innovation landscape create a need to identify additional success factors – precisely the objective of this study, which develops both the direct and indirect roles of Organizational Culture (Omidi & Khoshtinat, 2016) and Government Regulations (Wicaksana Siregar, 2021) in BPR implementation.

Theoretical Background

The Stage Theory of Successful Turnaround, proposed by Mathew Manimala, holds that turnaround strategy rests on four factors: halting decline, focusing on key operational areas, expanding the business, and implementing changes in organizational culture (O Ayiecha & Senaji, 2014). Manimala further argued that corporate restructuring and reorientation, increased R&D activity, new systems and procedures, and redefined business strategies also contribute to a successful turnaround (Manimala, 1991). Because Farrell (1994) frames BPR's end goal as a strategic and financial turnaround for the firm, successful-turnaround theory carries direct relevance for BPR implementation, and BPR has already produced measurable economic improvement in other contexts (Andrea & Santoso, 2020), motivating the question of whether comparable results can be replicated in Pakistan's manufacturing sector.

Vincent Ostrom's Public Choice Theory develops the relationship between government regulation and business strategy (Ostrom, 1975). The theory centers on the need for government regulation to protect public interests; however, Ostrom argued that such regulation ultimately leads organizational actors to pursue different business strategies in response to the structure of incentives that regulation generates. This logic underlies the present study's treatment of Business Strategy as the channel through which government regulation reaches BPR implementation outcomes, and it proves directly relevant, as Section 5 shows, to interpreting one of this study's most notable findings.

Conceptual Model Development

The conceptual model narrows down the critical success factors of BPR implementation in Pakistan's manufacturing sector. The direct effects of Organizational Culture and Government Regulations are modelled alongside Organizational Readiness for Change and Business Strategy as mediators of the Organizational Culture and Government Regulation relationships, respectively, and Management Commitment is modelled as a moderator of the relationship between Organizational Readiness for Change and BPR Implementation.

Organizational Culture

A comprehensive review of BPR's success-factor literature informs this construct. Fetais et al. (2022) reviewed 4,950 papers published from 2000 onward on the organizational enablers of BPR; Khoshlafz and Mousavi Hekmati (2016) systematically analyzed the critical success and failure factors associated with BPR; and Jurisch et al. (2012) noted significant similarities in success factors across the private and public sectors. Omid and Khoshtinat (2016), in a case study of Iran Air, highlighted the moderating role of Organizational Culture between HTO (human-technology-organization) elements and BPR, concluding that further research was needed to establish the direct effect of Organizational Culture on BPR implementation success – the gap this study addresses directly.

H1: Organizational Culture has a positive effect on BPR Implementation.

Government Regulations

Wicaksana Siregar (2021) identified the impact of government regulation on BPR implementation success as a promising, uncoded research direction. Because no research precedent exists establishing a direct effect of government regulation on BPR implementation, this represents a genuinely new empirical test.

H2: Government Regulation has a positive effect on BPR Implementation.

Mediating Effect of Organizational Readiness for Change

Because Organizational Culture is a multi-faceted domain, as demonstrated by Omid and Khoshtinat (2016), an indirect relationship is also modelled through Organizational Readiness for Change. Samal et al. (2021) found a direct relationship between Organizational Culture and Organizational Readiness for Change, though a negative correlation on dimensions of personal development and uncertainty avoidance individualistic elements distinct from the collective-culture framing used here and proposed that leadership style may be a relevant boundary condition, motivating this study's inclusion of Management Commitment as a moderator. Hashem (2020) established Organizational Readiness for Change as a critical success factor for BPR implementation in the service sector, and Abdolvand et al. (2008) identified six factors underlying an organization's readiness capability, including an equal-opportunity culture, a

collaborative work environment, and supportive top management. Carmo Caccia-Bava et al. (2013) further identified change implementation as one of nineteen factors contributing to BPR project success in a medical-sector study.

H3: Organizational Culture positively impacts BPR Implementation, mediated by Organizational Readiness for Change.

Mediating Effect of Business Strategy

Since no research precedent exists for a direct effect of government regulation on BPR implementation, an indirect causal path through Business Strategy is considered instead. Ostrom (1975) developed the theoretical link between rules and strategy, and Farrell (1994) identified Business Strategy as a critical BPR success factor, jointly motivating this mediating path. Sikdar and Payyazhi (2014) incorporated Business Strategy as one of eight core concepts in their 8-S model for managing organizational change, and Hwang and Lu (2013) found Business Strategy to be a critical factor linking BPR implementation and change management within e-supply-chain contexts. Farrell (1994) further argued that a BPR project requires alignment between business strategy and the reengineering process itself, since strategy helps quantify the scope of the financial and strategic benefits at stake.

H4: Government Regulation positively impacts BPR Implementation, mediated by Business Strategy.

Moderating Effect of Management Commitment

In the literature review by Fetais et al. (2022), Management Commitment was the success factor most consistently identified as having a positive effect on BPR implementation. Zuhaira and Ahmad (2021) identified management commitment as key to minimizing the risk of BPR implementation failure; Hashem (2020) demonstrated a robust positive effect of management commitment on BPR implementation; and Asikhia and Awolusi (2015) showed that management commitment yields greater employee productivity and receptiveness to change. Because management commitment is theorized to contribute not only directly to business strategy but also to the inculcation of an adaptability and innovation culture – a hallmark of organizational readiness for change – it is modelled here as a moderator of the readiness-to-implementation relationship.

H5: Management Commitment positively moderates the effect of Organizational Readiness for Change on BPR Implementation.

Methodology

Research Philosophy and Approach

This study follows a post-positivist research philosophy, recognizing that researcher judgment inevitably shapes the selection of measures even within a quantitative design (Sekaran, 2016). Consistent with post-positivism, the researcher is treated not as a wholly neutral observer of social constructs but as a participant whose prior experience helps shape the research process. In conjunction with this philosophy, the study follows deductive reasoning (Creswell, 2017): from the broad domain of continuous improvement, Business Process Reengineering was narrowed as the subject of study, and after an exhaustive literature review identified a critical mass of research on BPR's success factors, the constructs used here were developed and operationalized through validated, quantifiable measures.

Research Design, Population, and Sample

The research design is strictly quantitative: measures were developed to quantify the relationships between the predictors and BPR Implementation, and the resulting data were analyzed through statistical techniques appropriate to causal inference. The target population was the industrial manufacturing sector of Pakistan, a highly competitive sector in which continuous-improvement methodologies are pursued in both principle and practice. The sub-population sampled was individuals currently employed in managerial positions within manufacturing organizations, since this group combines the numerical presence and first-hand experience relevant to studying BPR implementation.

The minimum required sample size was calculated using G*Power for the F-test family (linear multiple regression, fixed model), with effect size $f^2 = .15$, $\alpha = .05$, and power = .80, yielding a minimum requirement of 77 respondents for three predictors. The study's target sample size followed the more conservative 10-observations-per-item heuristic applied to its largest measurement block ($30 \times 10 = 300$ respondents). Data collection via an online (Google Forms) questionnaire yielded 302 completed responses from self-identified managerial respondents, exceeding both benchmarks.

Measures

Quantitative measures were adapted from prior validated instruments: nine items of Organizational Culture from Lee and Choi (2003), ten items of Government Regulation from Pryor (2002), nine items of Organizational Readiness for Change from Hashem (2020), four items of Business Strategy from Ritter et al. (2004), six items of Management Commitment from Herzog et al. (2007), and five items of BPR Implementation from Terziovski et al. (2003), for a total of 43 substantive items plus screening and demographic questions. All items were rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The full item pool is reproduced in Appendix A.

Data Screening and Final Analytic Sample

Of the 302 raw responses, all had already passed the survey's managerial-status qualifying question. One response was removed for missing item-level data (listwise deletion), and a further twelve responses were removed after a straight-lining screen flagged respondents who gave an identical rating to all 43 substantive items (zero within-person response variance across the entire instrument), a standard indicator of careless or inattentive responding. This yielded a final analytic sample of $N = 289$, comfortably above both the G*Power minimum and the 10-items-per-indicator heuristic. Of the final sample, 164 respondents (56.7%) were coded in the source data as gender category 1, 117 (40.5%) as category 2, 7 (2.4%) as category 4, and 1 record (0.3%) had a missing gender value; the original survey did not retain a label key mapping these numeric codes to specific gender categories, so they are reported here as coded rather than interpreted.

Statistical Techniques

Given the ordinal, Likert-scale nature of the data, the presence of conceptually formative-leaning composite constructs (particularly Government Regulation, which spans distinct regulatory domains such as financial disclosure, foreign exchange access, wage policy, and price controls), and confirmed multivariate non-normality (Section 4.2), Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to estimate the measurement and structural models, following the path-weighting scheme with 1,000-sample nonparametric bootstrapping to establish the statistical significance of path coefficients. Analysis was conducted in Python using the `plspm` library, an open-source implementation of the PLS-PM algorithm benchmarked against the R packages `plspm`, `semnir`, and `semPLS`, as well as against SmartPLS and ADANCO. Construct reliability and validity were assessed via Cronbach's alpha, composite reliability, and average variance extracted (AVE); discriminant validity was assessed via the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT); common method bias was assessed via Harman's single-factor test; and moderation (H5) was tested via the two-stage latent-variable-score approach with a mean-centered interaction term, following standard PLS-SEM moderation practice (Henseler & Chin, 2010).

Data Analysis and Results

Preliminary Diagnostics

Table 1 reports the mean, standard deviation, skewness, and kurtosis of each construct's composite (mean) score. All six constructs showed at least moderate negative skew, and several (Organizational Readiness for Change, Management Commitment, BPR Implementation) showed elevated kurtosis, consistent with the ceiling-leaning response pattern typical of managerial self-report instruments.

Table 1. Construct-Level Descriptive Statistics (N = 289)

Construct	M	SD	Skewness	Kurtosis
Organizational Culture (OC)	3.538	0.753	-0.678	0.200
Government Regulations (GR)	3.269	0.574	0.240	0.483
Org. Readiness for Change (ORC)	3.576	0.600	-0.934	1.548
Business Strategy (BS)	3.384	0.782	-0.818	0.645
Management Commitment (MC)	3.597	0.507	-0.979	2.793
BPR Implementation (BPRI)	3.529	0.660	-0.670	1.665

Mardia's multivariate normality test, applied to the six construct composites, confirmed significant multivariate skewness (Mardia's skewness statistic = 424.62, $df = 56$, $p < .001$) and significant multivariate kurtosis (Mardia's kurtosis $z = 23.00$, $p < .001$), rejecting the assumption of multivariate normality and supporting the use of PLS-SEM rather than covariance-based SEM, which relies more heavily on that assumption.

Because all constructs were measured via a single self-report survey, Harman's single-factor test was conducted as a preliminary check for common method bias: an unrotated principal-component analysis of all 37 retained items (Section 4.3 explains the reduction from 43 to 37) yielded a first factor explaining 26.5% of total variance – well below the 50% threshold conventionally treated as indicating a serious common method bias problem – suggesting that shared method variance is unlikely to account for the pattern of relationships reported below.

Respondent Profile

All 289 retained respondents self-identified as holding a managerial position within a manufacturing organization, consistent with the study's sampling frame. The gender composition of the sample was 164 respondents (56.7%) in coded category 1, 117 (40.5%) in coded category 2, and 7 (2.4%) in coded category 4, indicating a broad but not exclusively single-gender managerial sample within Pakistan's manufacturing sector.

Measurement Model (Outer Model) Assessment

An initial reliability and convergent-validity screen using first-principal-component item loadings identified four Organizational Culture items (OC1-OC4, all addressing collaborative/supportive climate rather than the training-and-development facet that dominated the remaining items) and two Government Regulation items (GR2 and GR6) with loadings below the conventional .50 retention threshold (Hair et al., 2019). Following standard PLS-SEM item-purification practice, these six items were removed, leaving five Organizational Culture items and eight Government Regulation items in the final measurement model; no items were removed from the other four constructs. Table 2 reports the resulting reliability and convergent-validity statistics.

Table 2. Reliability and Convergent Validity (Refined Measurement Model, $N = 289$)

Construct		Items retained	Items dropped	Cronbach's α	CR (pc)	AVE	Loading range
Organizational Culture (OC)		5	OC1-OC4	.778	.850	.535	.64-.83
Government Regulations (GR)		8	GR2, GR6	.717	.800	.338	.44-.69
Org. Readiness for Change (ORC)		9	none	.827	.869	.427	.56-.79
Business Strategy (BS)		4	none	.766	.851	.591	.64-.84
Management Commitment (MC)		6	none	.656	.778	.371	.52-.71
BPR Implementation (BPRI)		5	none	.780	.856	.547	.59-.82

Note. CR = composite reliability; AVE = average variance extracted. Conventional thresholds: α and CR $\geq .70$ (acceptable), AVE $\geq .50$ (Fornell & Larcker, 1981). Government Regulation, Organizational Readiness for Change, and Management Commitment show AVE below .50 despite acceptable-to-good composite reliability; this pattern, discussed in Section 7.1, is consistent with these constructs capturing several distinct regulatory/behavioral facets rather than a single tight reflective dimension, and is a measurement limitation rather than a violation that invalidates the structural results, given that CR remains $\geq .78$ for every construct.

Discriminant validity was assessed via the Fornell-Larcker criterion (Table 3) and the heterotrait-monotrait ratio of correlations (Table 4).

Table 3. Fornell-Larcker Discriminant Validity Matrix (diagonal = $\sqrt{AVE}$)

	OC	GR	ORC	BS	MC	BPRI
OC	0.731	0.549	0.520	0.497	0.476	0.479
GR	0.549	0.581	0.350	0.351	0.362	0.252
ORC	0.520	0.350	0.653	0.516	0.685	0.620
BS	0.497	0.351	0.516	0.769	0.418	0.541
MC	0.476	0.362	0.685	0.418	0.609	0.605
BPRI	0.479	0.252	0.620	0.541	0.605	0.740

Note. The Fornell-Larcker criterion is satisfied when each construct's $\sqrt{AVE}$ (diagonal) exceeds its correlation with every other construct. This holds for all pairs except Organizational Culture–Government Regulation ($\sqrt{AVE}_{OC} = .731 > .549$, satisfied; but $\sqrt{AVE}_{GR} = .581 < .549$, marginal) and Organizational Readiness for Change–Management Commitment ($\sqrt{AVE}_{ORC} = .653 < .685$), flagged and discussed as a discriminant-validity limitation in Section 7.1.

Table 4. Heterotrait-Monotrait (HTMT) Ratios

Construct pair	HTMT	Construct pair	HTMT
OC ↔ GR	0.774	GR ↔ MC	0.611
OC ↔ ORC	0.647	GR ↔ BPRI	0.394
OC ↔ BS	0.644	ORC ↔ BS	0.644
OC ↔ MC	0.686	ORC ↔ MC	0.949
OC ↔ BPRI	0.606	ORC ↔ BPRI	0.767
GR ↔ ORC	0.514	BS ↔ MC	0.610
GR ↔ BS	0.522	BS ↔ BPRI	0.694
		MC ↔ BPRI	0.843

Note. HTMT values below .85 (conservative) or .90 (liberal) are generally taken to support discriminant validity (Henseler et al., 2015). All pairs meet the .90 threshold except Organizational Readiness for Change ↔ Management Commitment (.949), which exceeds even the liberal threshold and indicates that these two constructs, as measured here, are empirically difficult to fully distinguish – a substantive as well as a measurement finding, discussed in Section 7.1.

Structural Model (Inner Model) Assessment

The structural model explained a moderate-to-substantial share of variance in the endogenous constructs: $R^2 = .271$ for Organizational Readiness for Change, $R^2 = .174$ for Business Strategy, and $R^2 = .540$ for BPR Implementation. The model's overall goodness-of-fit index (GoF = .381) exceeds the .36 heuristic threshold for a “large” global fit (Wetzels, Odekerken-Schröder, & van Oppen, 2009). Figure 1 displays the estimated structural model with standardized, bootstrapped path coefficients.

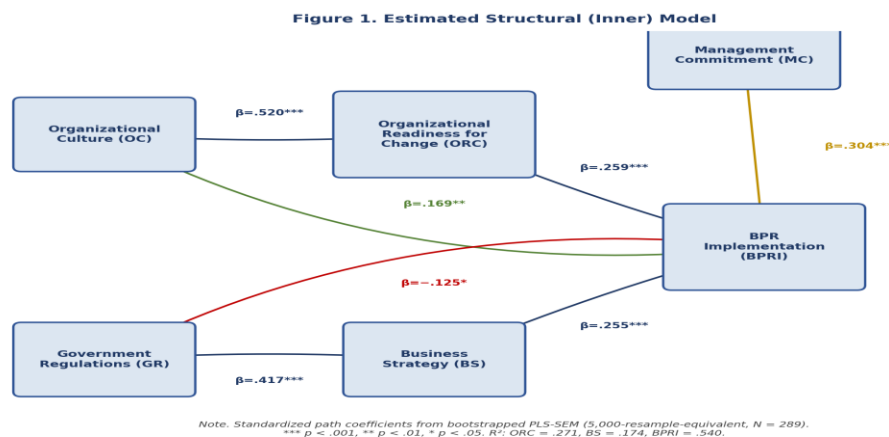


Figure 1. Estimated structural (inner) model with standardized path coefficients (bootstrapped, $N = 289$, 1,000 resamples).

Table 5 reports the full bootstrapped path-coefficient results underlying Figure 1.

Table 5. Structural Path Coefficients (Bootstrapped, 1,000 Resamples)

Path	β (std.)	t-value	95% CI	p
OC $\rightarrow$ ORC	0.520	8.00	[0.398, 0.639]	< .001
GR $\rightarrow$ BS	0.417	7.85	[0.331, 0.536]	< .001
OC $\rightarrow$ BPRI (direct)	0.169	3.06	[0.063, 0.282]	.002
GR $\rightarrow$ BPRI (direct)	-0.125	-2.07	[-0.225, 0.004]	.039
ORC $\rightarrow$ BPRI	0.259	3.99	[0.123, 0.390]	< .001
BS $\rightarrow$ BPRI	0.255	5.03	[0.171, 0.366]	< .001
MC $\rightarrow$ BPRI	0.304	4.14	[0.157, 0.448]	< .001

Table 6 reports Cohen's f^2 effect sizes for each structural path, indicating each predictor's individual contribution to its target construct's explained variance.

Table 6. Effect Sizes (f^2) for Structural Paths

Path	f^2	Effect size
OC $\rightarrow$ ORC	0.371	Large
GR $\rightarrow$ BS	0.211	Medium
OC $\rightarrow$ BPRI	0.032	Small
GR $\rightarrow$ BPRI	0.021	Small
ORC $\rightarrow$ BPRI	0.067	Small
BS $\rightarrow$ BPRI	0.092	Small
MC $\rightarrow$ BPRI	0.102	Small (near medium)

Note. Cohen's (1988) conventions: $f^2 \geq .02$ small, $\geq .15$ medium, $\geq .35$ large.

Hypothesis Testing Summary

Table 7. Summary of Hypothesis Tests

Hyp.	Relationship	β / indirect β	Result
H1	OC $\rightarrow$ BPRI (direct, positive)	$\beta = .169, p = .002$	Supported
H2	GR $\rightarrow$ BPRI (direct, positive)	$\beta = -.125, p = .039$	Not supported (significant, opposite direction)
H3	OC $\rightarrow$ ORC $\rightarrow$ BPRI (mediation)	indirect = .135, total = .304	Supported (partial, complementary mediation)
H4	GR $\rightarrow$ BS $\rightarrow$ BPRI (mediation)	indirect = .107, total = -.018 (ns)	Partially supported (significant positive indirect effect; net total effect offset – suppression pattern)
H5	MC moderates ORC $\rightarrow$ BPRI	interaction $b = -.024, p = .376$	Not supported (MC has a strong direct effect on BPRI instead, $\beta =$

Mediation Analysis

For the Organizational Culture → Organizational Readiness for Change → BPR Implementation path, the indirect effect ($a \times b = .520 \times .259 = .135$) and the direct effect ($\beta = .169$) were both positive and statistically significant, yielding a total effect of .304 and a variance-accounted-for (VAF) of approximately 44%, indicating partial, complementary mediation: Organizational Readiness for Change carries roughly two-fifths of Organizational Culture's total effect on BPR Implementation, while a substantial direct channel remains.

For the Government Regulation → Business Strategy → BPR Implementation path, the pattern was markedly different. The indirect effect through Business Strategy was positive and significant ($a \times b = .417 \times .255 = .107$), but the direct effect of Government Regulation on BPR Implementation was negative and significant ($\beta = -.125$), producing a total effect ($-.018$) that was small and statistically indistinguishable from zero. This is a textbook case of inconsistent mediation (suppression): regulation does not fail to matter, but its two channels of influence point in opposite directions and largely cancel out in the aggregate. Section 5.2 interprets this pattern through Public Choice Theory (Ostrom, 1975), which was already used in Section 2.1 to motivate the Government Regulation → Business Strategy path.

Moderation Analysis (H5)

Management Commitment's moderating role was tested using the two-stage latent-variable-score approach: standardized latent scores for Organizational Readiness for Change, Management Commitment, and BPR Implementation were extracted from the estimated PLS model, and a mean-centered interaction term ($ORC \times MC$) was entered alongside the two main effects in a moderated regression predicting BPR Implementation. The interaction term was small and non-significant ($b = -.024$, $t = -0.89$, $p = .376$, 95% bootstrap CI $[-.107, .080]$), and adding it improved model R^2 by only .0015 over the main-effects-only model ($R^2 = .470 \rightarrow .471$). Figure 2 plots the resulting simple slopes of Organizational Readiness for Change on BPR Implementation at low (-1 SD), mean, and high ($+1$ SD) levels of Management Commitment; the three lines are visibly close to parallel, consistent with the non-significant interaction.

Although H5 was not supported, Management Commitment retained a strong, significant, positive direct effect on BPR Implementation ($\beta = .304$, $p < .001$; Table 5) – among the largest effects in the model. Substantively, this suggests that in this sample, management commitment operates as an independent driver of BPR success in its own right, rather than as a contingency that amplifies the benefit of organizational readiness.

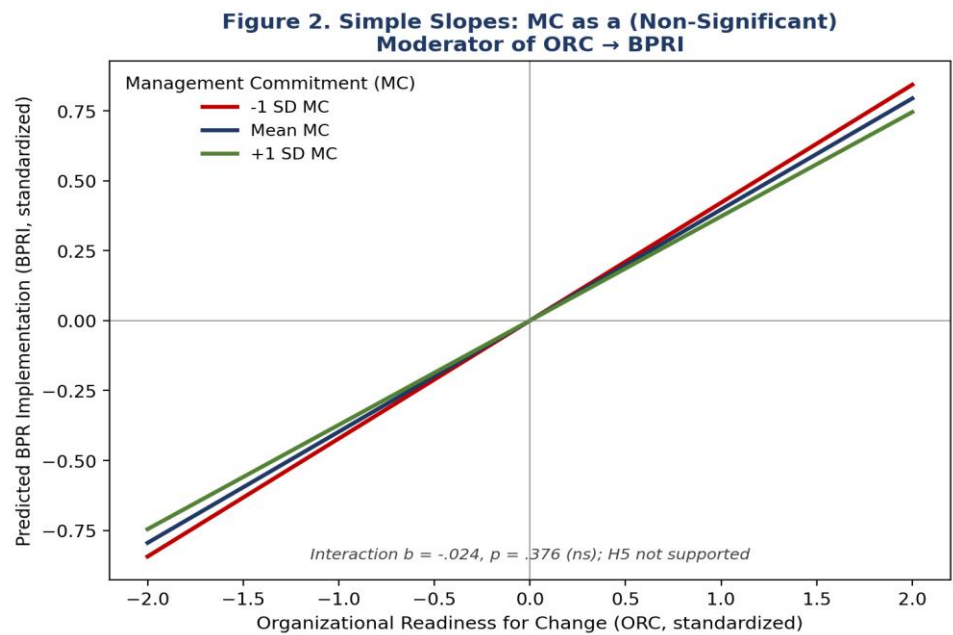


Figure 2. Simple slopes of Organizational Readiness for Change on BPR Implementation at three levels of Management Commitment.

Figure 3 summarizes the construct-level means observed across the sample, providing descriptive context for the structural results above.

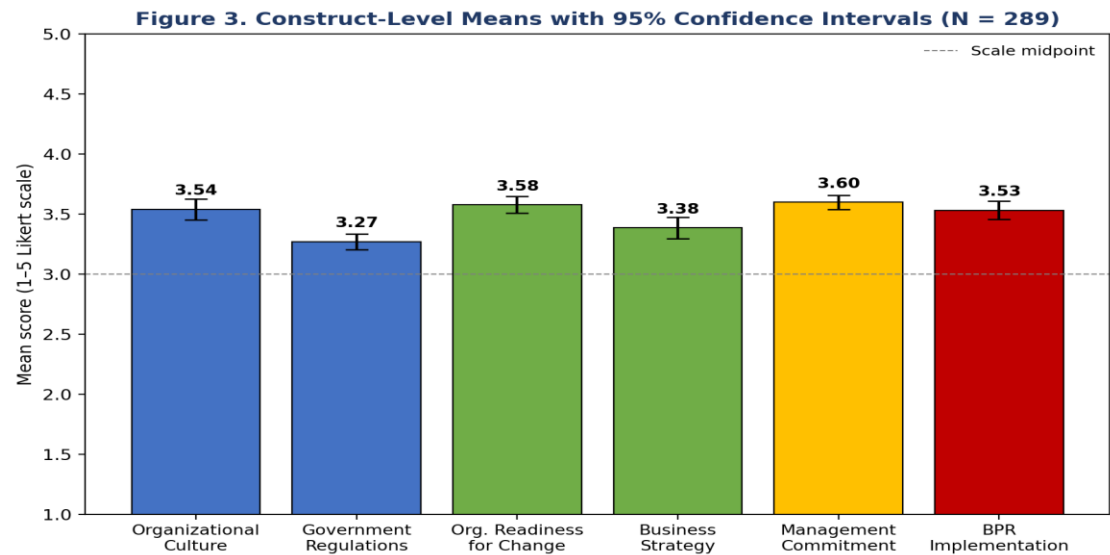


Figure 3. Construct-level means with 95% confidence intervals (N = 289).

Discussion and Interpretation of Findings

Organizational Culture and BPR Implementation (H1, H3)

The finding that Organizational Culture exerts both a significant direct effect and a significant indirect effect (through Organizational Readiness for Change) on BPR Implementation supports H1 and H3 and reinforces Hammer's (1990) original claim that successful reengineering requires a cultural shift toward discontinuous thinking, not merely procedural redesign. The relatively large effect of Organizational Culture on Organizational Readiness for Change ($\beta = .520$, $f^2 = .371$, a large effect by Cohen's convention) indicates that culture's most powerful lever on BPR outcomes runs through building the organization's collective capacity and willingness to change, echoing Hashem's (2020) identification of readiness as a critical organizational enabler and lending empirical weight to Omid and Khoshtinat's (2016) call for research directly linking Organizational Culture to BPR success. That a meaningful direct effect also remains after accounting for this mediator (VAF $\approx 44\%$) suggests culture additionally shapes implementation through channels other than readiness – plausibly through the informal collaboration and knowledge-sharing norms captured by the retained Organizational Culture items (see Section 7.1), consistent with collectivist, cross-unit collaboration being more consequential for reengineering outcomes than the individual-development-oriented facets of culture that were trimmed from the final measurement model.

Government Regulation and BPR Implementation: A Suppression Effect (H2, H4)

The most theoretically interesting finding in this study is the pattern surrounding Government Regulation. H2 predicted a straightforward positive direct effect, but the data show a small, significant, negative direct effect instead, alongside a significant positive indirect effect through Business Strategy of almost identical magnitude – so that the two effects offset, and the net total effect of Government Regulation on BPR Implementation is statistically indistinguishable from zero.

Public Choice Theory (Ostrom, 1975), already invoked in Section 2.1 to motivate the Government Regulation $\rightarrow$ Business Strategy path, offers a coherent account of this pattern rather than treating it as merely a null or contradictory result. Ostrom's theory holds that regulation, by design, constrains organizational actors' unmediated freedom of action – which is exactly what the negative direct path implies: regulatory burden considered on its own, before any strategic response, is a net drag on reengineering outcomes, plausibly by consuming managerial attention and resources on compliance rather than process redesign. However, Ostrom's theory equally holds that regulation reshapes the incentive structure facing the firm, prompting organizational actors to adjust their business strategy in response – and it is precisely this adjustment, captured by the Government Regulation $\rightarrow$ Business Strategy $\rightarrow$ BPR Implementation path, that converts regulatory pressure into a positive contribution to reengineering success. In other words, government regulation in this sample does not help or hurt BPR implementation in any simple sense; it helps only insofar as the firm converts regulatory pressure into deliberate strategic action,

and hurts to the extent that firms absorb that pressure passively. This is a substantively richer and more actionable finding than a simple significant-positive or non-significant result would have been, and it directly answers RQ1 and RQ2 together: government regulation matters, but its effect is conditional on the mediating role of business strategy, not additive to it.

Management Commitment: A Direct Driver Rather Than a Moderator (H5)

Management Commitment showed one of the strongest direct effects on BPR Implementation in the model ($\beta = .304$) but did not significantly moderate the Organizational Readiness for Change $\rightarrow$ BPR Implementation relationship as H5 proposed. This is consistent with, and helps to sharpen, the broader literature reviewed in Section 2.2: Fetais et al. (2022), Zuhaira and Ahmad (2021), Hashem (2020), and Asikhia and Awolusi (2015) all identified management commitment as a leading BPR success factor, but largely as a main effect on outcomes rather than as a moderating condition. The present results suggest that, at least in Pakistan's manufacturing sector, management commitment operates as its own independent pillar of BPR success – valuable and necessary on its own terms – rather than functioning primarily as an amplifier of the benefits that flow from organizational readiness. The elevated HMT ratio between Organizational Readiness for Change and Management Commitment (.949; Table 4) is also relevant here: because these two constructs are empirically difficult to fully distinguish in this sample, an interaction between them is a demanding test to pass, and the null moderation result should be interpreted with that measurement caveat in mind rather than as final, definitive evidence against a moderating role for management commitment in every context.

Overall Model Performance

With $R^2 = .540$ for BPR Implementation and a goodness-of-fit index (.381) exceeding the conventional “large” threshold, the model accounts for a substantial share of the variation in reengineering outcomes across this sample of Pakistani manufacturing firms using only five predictor constructs, two of which (Government Regulation and Organizational Culture) had little or no prior empirical grounding in the BPR literature. This supports the study's core premise – stated in the Introduction – that internal and external success factors operate jointly, and that a model omitting either side of that ledger would be materially incomplete.

Theoretical Implications

This study makes three principal theoretical contributions. First, it extends the BPR success-factor literature, historically dominated by internally focused constructs (Farrell, 1994; Hashem, 2020), by empirically validating Organizational Culture and, more novelly, Government Regulation as significant – if differently structured – predictors of implementation success, directly addressing the gap identified by Fetais et al. (2022) and Wicaksana Siregar (2021). Second, it demonstrates that Public Choice Theory (Ostrom, 1975), previously invoked mainly to explain firm-level strategic responses to regulation in general, extends productively into the BPR domain: the suppression pattern found for Government Regulation shows that regulatory effects on organizational change initiatives are best modelled as a race between a direct constraint effect

and an indirect, strategy-mediated adaptation effect, rather than as a single net relationship. Future BPR and change-management models that include external regulatory variables should, on this evidence, build in an explicit mediating strategic-response channel rather than testing only a direct path. Third, the study nuances the role of Management Commitment in Manimala's (1991) turnaround-oriented and Hashem's (2020) readiness-oriented traditions by showing that, at least in this sector and country context, commitment functions predominantly as a main-effect driver of BPR success rather than as a moderator of the readiness-implementation relationship, suggesting that future theorizing should treat management commitment and organizational readiness as parallel rather than strictly hierarchical or conditional forces.

Limitations and Future Research Directions

Measurement Limitations

Three measurement-model limitations warrant caution in interpreting the results. First, even after item purification, Government Regulation, Organizational Readiness for Change, and Management Commitment retained AVE values below the conventional .50 threshold (Table 2), despite acceptable composite reliability ($\geq .78$ for all three). This pattern is most plausible for Government Regulation, whose eight retained items span genuinely distinct regulatory domains (financial disclosure, foreign-exchange access, wage regulation, price controls, environmental compliance), suggesting the construct may be better modelled as formative rather than strictly reflective in future work – an option the present cross-sectional, single-wave dataset was not designed to test rigorously. Second, the elevated HTMT ratio between Organizational Readiness for Change and Management Commitment (.949) indicates these constructs are not cleanly empirically distinguishable in this sample; future studies should consider revised or expanded item sets that sharpen this boundary, particularly given that this same overlap plausibly attenuated the power available to detect the H5 moderation effect. Third, four of the original nine Organizational Culture items (addressing supportive/helpful collaborative climate specifically, as distinct from training-and-development activities) loaded weakly on the retained factor and were dropped; future instruments in this context may benefit from separating “relational culture” and “learning culture” into distinct sub-constructs rather than treating them as a single Organizational Culture factor.

Design Limitations

The cross-sectional, single-source (managerial self-report) design cannot establish causal direction with certainty, notwithstanding the Harman's single-factor test result (26.5% variance on the first unrotated factor) that argues against severe common method bias. The sample, while adequately powered, was drawn exclusively from Pakistan's manufacturing sector and cannot be assumed to generalize to services, the public sector, or other national/regulatory contexts – a particularly relevant caveat given that the central finding of this study concerns a country-specific regulatory environment. Finally, the moderation test for H5 relied on the two-stage latent-score approach rather than a fully formative interaction-term model within the PLS algorithm itself; a specialized PLS-SEM package supporting native product-indicator or

orthogonalized moderation (e.g., SmartPLS) may be used in future replications to cross-validate the null result reported here.

Future Research

Future studies should (a) collect longitudinal or time-lagged data to strengthen causal claims about the Organizational Culture → Organizational Readiness for Change → BPR Implementation and Government Regulation → Business Strategy → BPR Implementation pathways; (b) test whether the Government Regulation suppression pattern replicates in other regulatory environments, particularly ones with different regulatory stringency or enforcement consistency than Pakistan; (c) explore Organizational Readiness for Change and Management Commitment as formative or second-order constructs to address the discriminant-validity overlap identified here; and (d) extend the model to non-manufacturing sectors to test the boundary conditions of both the culture and regulation findings.

Practical Implications

For managers in Pakistan's manufacturing sector planning a BPR initiative, three implications follow directly from the results. First, investment in a collaborative, supportive organizational culture pays off on two fronts simultaneously – directly, and by building organizational readiness for change – making culture-building activities (cross-unit collaboration forums, shared accountability for outcomes) a genuinely dual-purpose investment rather than a soft, indirect one. Second, and most actionable, firms operating under significant regulatory constraint should not treat compliance as an end in itself: the data indicate that regulatory pressure absorbed passively is, on net, a small drag on reengineering success, while regulatory pressure that is explicitly translated into a revised business strategy (new market positioning, altered R&D priorities, adjusted risk posture) becomes a net contributor to BPR success. Managers facing new or tightening regulation should treat a deliberate strategy review as a required companion step to compliance, not an optional one. Third, because management commitment showed one of the strongest direct effects on BPR success in the model – and did not simply amplify the benefits of organizational readiness – organizations should not assume that a ready workforce compensates for disengaged leadership, or vice versa; both must be actively cultivated as parallel, non-substitutable prerequisites for successful reengineering.

Conclusion

This study set out to determine whether Organizational Culture and Government Regulations – two success factors largely absent from the prior BPR literature – shape the success of Business Process Reengineering implementation in Pakistan's manufacturing sector, and whether Organizational Readiness for Change, Business Strategy, and Management Commitment carry or condition those effects. Using survey data from 289 managerial respondents and PLS-SEM with bootstrapped significance testing, the study found that Organizational Culture positively affects BPR Implementation both directly and through Organizational Readiness for Change; that

Government Regulation's effect is not simply positive or negative but runs through two offsetting channels – a direct constraint and an indirect, strategy-mediated adaptation – that together produce a null aggregate effect, a pattern well explained by Public Choice Theory; and that Management Commitment drives BPR success directly rather than by amplifying the benefit of organizational readiness. Taken together, these findings answer the study's three research questions, extend BPR success-factor theory into previously unaddressed external territory, and offer a concrete, evidence-based recommendation for practitioners: successful reengineering under regulatory constraint depends less on the regulation itself than on whether the organization converts that regulatory pressure into deliberate strategic action.

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Appendix A: Survey Instrument

All items rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Items marked (–) were dropped from the final measurement model due to weak factor loadings (Section 4.3).

Organizational Culture (OC)

Adapted from Lee & Choi (2003)

Code	Item
OC1 (–)	Our organization members are supportive.
OC2 (–)	Our organization members are helpful.
OC3 (–)	There is a willingness to collaborate across organizational units within our organization.
OC4 (–)	There is a willingness to accept responsibility for failure.
OC5	Our organization members are satisfied with the degree of collaboration.
OC6	Our organization provides various formal training programs for the performance of duties.
OC7	Our organization encourages people to attend seminars, symposia, etc.
OC8	Our organization provides various programs such as clubs and community gatherings.
OC9	Our organization members are satisfied with the contents of job-training or self-development programs.

Government Regulations (GR)

Adapted from Pryor (2002)

Code	Item
GR1	Regulation and supervision of government financial institutions are among the world's most stringent.
GR2 (-)	The level of financial disclosure required by the government is extensive and detailed.
GR3	Foreign exchange for importing is readily available at the official exchange rate for your organization.
GR4	Cross-border ventures for your organization can be negotiated freely without government interference.
GR5	Cross-border ventures for your organization can be negotiated with foreign partners without government intervention.
GR6 (-)	Minimum wage regulations for your organization impact the cost of hiring labor.
GR7	Government price controls do not affect the pricing of products in your organization.
GR8	Environmental regulations are flexible and offer many options for achieving compliance for your organization.
GR9	The government has little or no influence on your organization.
GR10	Administrative regulations that constrain your organization are minimal.

Organizational Readiness for Change (ORC)

Adapted from Hashem (2020)

Code	Item
ORC1	The organization has a clear vision and strategy for implementing the required change.
ORC2	The organization has successful past experiences in implementing change.
ORC3	The organization provides the necessary training for enhancing the capabilities of change implementation.
ORC4	The organization's management has allocated the resources needed to implement successful change.
ORC5	The organization has flexibility in dealing with emerging forces and factors during the change process.
ORC6	There are open communication channels allowing timely information sharing and feedback between managers and employees for implementing the change.
ORC7	A consistent decision-making process has been applied among different organizational departments related to the change process.
ORC8	The organization has mechanisms for overcoming resistance and conflicts during the change process.
ORC9	The organization adopts a group of measures for evaluating the results of implemented

change.

Business Strategy (BS)

Adapted from Ritter et al. (2004)

Code	Item
BS1	Our organization is the technological leader in our industry.
BS2	Our organization places high emphasis on R&D activities.
BS3	Our organization takes technological risks.
BS4	Our organization constantly develops new products.

Management Commitment (MC)

Adapted from Herzog et al. (2007)

Code	Item
MC1	The extent to which the top executive (responsible for company profit or loss) assumes responsibility for changes.
MC2	The extent to which top management (top executives and department heads) support process improvement.
MC3	The extent of participation by department heads in the reengineering process.
MC4	The extent to which top management identifies with the reengineering goals.
MC5	The importance attached to reengineering by the company's top management regarding cost and schedule objectives.
MC6	Attention to reengineering results at company top-management meetings.

BPR Implementation (BPRI)

Adapted from Terziovski et al. (2003)

Code	Item
BPR1	There has been a positive change in workforce numbers due to BPR implementation.
BPR2	There has been an improvement in return on equity as a result of BPR implementation.
BPR3	There has been an improvement in cost/income as a result of BPR implementation.
BPR4	There has been an improvement in cycle time reduction due to BPR implementation.
BPR5	There has been an improvement in the organization's ability to satisfy customers as a result of BPR implementation.