

Business Processes Capability and Performance: A South African Perspective

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Abstract--Successful organisations depend on leadership, process optimisation, and utilisation of resources. Optimisation is achievable through well-defined systems and supporting processes that guide organisations towards excellence. Organisations need to understand operational and individual business processes as well as the strategic impact on the supply network. Effective optimisation impacts strategically on quality cost, revenue, investment, and capabilities. Business Process Capability measurements forces organisational leaders, managers and employees to critically analyse existing business processes, and determine gaps identifying existing performances and sub-optimal states. Many organizations in South Africa misunderstand business process capability and measure success on revenue and profits generated hiding inefficiencies that could be concealed by the profits. One of the contributing factors might be that some companies in South Africa lack international competitiveness, do not optimize their business processes nor align business processes and available resources to adhere to organizational goals and calls for radical redesign of business processes resulting from end-to-end fulfilling internal and external customer needs. The paper will show why organisations should base their competitiveness on a value chain and end - to - end business processes optimisation rather than only profit.

I. BACKGROUND

Globally and especially South Africa is experiencing economic hardships and organisations must be concerned about competitiveness [12]. South African companies should concentrate on their core business. They should eliminate waste, ensure that they are capable, and focus how to differentiate them from their competitors [24].

Organisations strive to attain their survival on customer's perception of their quality and service delivery. Success depends on leadership, process optimisation, and utilisation of resources. To succeed organisations must have defined systems and supporting business processes guiding the organisation towards optimisation and excellence.

Numerous major quality breakthroughs were made since 1980. They are statistical process control, employee involvement, just-in-time (JIT), Total Quality Management (TQM), Quality Function Deployment (QFD), Quality Excellence Models, bench marking, Taguchi methods, and cost of quality related to poor-quality. However, once management realise that business and organisational processes, and not only people are the key to error-free performance it should improve [12].

Business processes is best describe as an activity or group of activities where the input of resources adds value and provides an output to internal or external customers whilst utilising all the resources to provide defined results towards performance, optimisation, and excellence, [12 and 8].

In essence, optimisation contributes to the strategic impact of a business in four distinct ways: namely (1) cost, (2) revenue, (3) investment, and (4) capabilities. All of these focus on cost reduction in delivering products and services of quality [27].

However, the basic concept of business processes is much broader than normally accepted as a process includes sub-processes and subsequent processes and sub-processes. It will have its own set of objectives, involves workflow that cuts across departmental boundaries and requires a combined input of resources from all business functions, business units, departments, managers and employees, [27].

To achieve Business Process Capability, organisations should develop plans to ensure business process capability. Reviewing of business process strategies, decisions and plans, is imperative and a continuous improvement programme instituted to ensure that intended results are achieved. Guaranteeing business process capability, adjustments made by means of optimisation techniques that include business process reengineering (BPR) and require significant continuous improvements to achieve a complete change in business processes. [11 and 16]

Organisations should embrace a total integrated business processes approach towards organisational performance, resulting in the delivery of ever-improving value to customers and stakeholders. It would contribute to organisational sustainability and improvement of overall organisational effectiveness and capability of resources and business processes to achieve organisational objectives [7].

A radical reshaping of business process design, organisation, and control is required from end-to-end that would enable the organisation to fulfil customer needs and enhancing ability to generate revenue to achieve a return on investment. Achievement is possible through well-defined integrated business process capabilities strategies with clear set objectives, defined performance objectives, the utilisation, and optimisation of resources and the involvement of business leaders, managers, and employees to be responsible for their performance in their respective departments within the organisations [10, 13, and 19].

Processes are characterised in terms of capability and the relationship between upper and lower specifications in process distribution. The two conditions ultimately define business process capability. It continuously challenges business leaders, managers, and employees to improve productivity, quality, and efficiency through revitalising of businesses and industries. Business leaders should continuously seek and implement strategies that will ensure

survival by means of continuous improving business processes [14]

The key to successful process decisions requires taking the following into considerations: (a) the best fit for the situation (b) optimisation of one process at the expense of another, (c) processes are building blocks that create a total business value chain which include the cumulative phases of business processes effecting output, customer satisfaction and competitive advantage, (d) there is no distinction between any processes in the value chain either performed by internal or by outside suppliers, and (e) that managers must pay attention interfacing all processes ensuring cross-functional coordination [19]

The paper focuses on the effect of the phenomenon on business and organizations and suggests a measuring tool that will enhance knowledge on all aspects needed to implement and sustain process capability in organisations and to furnish them with the necessary knowledge to identify critical factors required for business's processes capabilities. Performing gap analyses on organizational priorities versus actual occurrence in an effort to understand, plan, organise, lead and control business processes towards Business Process Capability Maturity and Performance.

II. BUSINESS PROCESS CAPABILITY MODEL

The objective of the study is to determine what functionalities or critical factors enable organisations to measure their readiness to implement Business Process Capability and assist organisational leaders, managers, and employees to critically analyse existing business processes by means of gap analysis whereby organisational priorities are analysed against existing practices, performances, and sub-optimal states [18].

Critical factors identified furthermore be utilised in compiling a comprehensive model and framework forming the basis of measuring organisations process capability and assist in implementation of an organisational strategy towards Business Process Capability (BPC).

The development of a BPC model included a thorough literature review of business capability models:

- a) American Productivity and Quality Centre (APQC) Process Classification Framework (PCF). [2]
- b) Business Process Maturity Model (BPMM) based on the work by Humphrey. W who developed the Process Maturity Framework (PMF), which is the foundation of the Business Process Capability Maturity Model (BPCM), [29].
- c) Business Process Maturity Model (BPMM) focuses on improvements at each stage and provides a foundation on which to build improvements undertaken at the next stage of business process improvement. Thus, an improvement strategy drawn from the BPMM provides a roadmap for continuous process improvement. [1]
- d) Capability Maturity Model (CMM) as introduced by Humphrey, W [12] Crosby, P, - Quality is Free (1979).

e) Crosby's Quality Management Maturity Grid (QMMG) [16]

A. *Criteria In Designing Critical Factors For BPC Measurement Model*

Critical Factors considered measuring the readiness of an organisation implementing Business Process Capability (BPC) include:

- a) Critical factors and items that management should have control over to achieve Business Process Capability and Performance
- b) A measurement tool, model or framework assisting organisations to assess their level of readiness or existing level of capability regarding BPC as a critical core capability
- c) Enforcement of top down and bottom- up integrated strategy BPC programme and alignment of:- Corporate strategy, Business strategy, and Corporate governance with organisational structure and operational capabilities
- d) Gap analysis of existing and desired state in terms of organisational strategies, priorities, structures, systems, processes, people behaviour to implement a continuous improvement programme to maintain Business Process Capability and Performance
- e) Business process improvement programs initiating an evaluation of the organisation's current strengths and weaknesses or maturity level at each stage
- f) A foundation for future improvements guiding the organisations BPMM and appraisal methods towards business process capability
- g) Risks identification towards successful implementation of systems providing guidance and actions towards improvement prior to system deployment and pro-active action rather than reactive action
- h) Evaluate suppliers capability against a set standard to evaluate the capability of vendors at a desired service level, quality, price, and functionality commitments
- i) Benchmark and evaluate organisation maturity of business processes in industry
- j) Critical attributes of business processes evaluating process capability contributing to organisational objectives
- k) Assessment of organisations existing level of capability and readiness towards BPC as critical core capability.
- l) Organisational change program focussing on different stages of improvements to achieve predictable state of organisational capability

B. *Preliminary Experimental Study - BPC Factors*

The development of BPC measuring model resulted from preliminary experimental study enables the design of a measurement tool framework [18]. This convincingly identified critical factors influencing the design of a cause and affects relationships between factors and factor-items of a particular condition or phenomenon. This evidently result in a greater degree of control, results output, internal validity, and reliability [20].

Key areas concur in the preliminary study phase:

- a) Corporate Strategy, Business Strategy, and Governance Policies and Procedure formulation
- b) Organisation Structure, roles, responsibilities, and people management
- c) Business Infrastructure, Processes Structure management
- d) System and Information Structure
- e) Process Optimisation, Process Improvement, and Process Review in order for the organisation to remain competitive
- f) Standards and Measurements in order for the organisation to evaluate and assess business processes against appropriate standards

Preliminary study focused and were formalised according to BPM [1] and Crosby's Quality Grid [16] focusing on key areas identified above. Selected participants participating in the study conformed to the following profiles:

- a) Continuously and actively working in either manufacturing or service industry environment
- b) Understanding the principles of Business Processes Improvement, Resources Optimisation, Capability, and Performance
- c) Be business owners, CEO, top or line managers, general managers, managers who head up departments and involved in business processes, applying policies and strategies in their respective organisations, have basic knowledge of project management, or be part of an organisations project team, or specialise in business project implementation and management
- d) Utilise processes and functionalities in, i.e. manufacturing, engineering, services, sales, mining, government, project managers, banking, etcetera,
- e) Possess academic qualification
- f) Knowledge of business processes, business process improvement, and resources optimisation

One hundred and sixty (160) people participated in the preliminary study consisting of business owners, factory manager, engineering managers, operation manager, quality manager/ assurance, consultants, supervisor/ foreman, administration, financial, IT specialist, human resources, marketing, suppliers, academia, logistics and warehouse managers, business analyst, and project managers.

Consequently, a BPC measurement model was designed that best fit the objectives identified to determine what functionalities or critical factors will enable organisations to measure their readiness to implement Business Process Capability.

C. Empirical Phase

1 Participants Criteria

The success in the development of a measuring tool measuring the readiness of an organisation to implement BPC depended on the selection of participants. Of utmost importance is that participants display knowledge and experience in business process optimisation.

A pool of eighty four (84) participants identified of whom sixty eight (68) participated in the study based on their experience, knowledge, involvement in business processes, functional positions, type of industry, project involvement [18].

Participants consisted of business owners, top to middle managers from a wide spectrum of functional departments or business units in an organisation involved in either manufacturing or services industries. The following Tables provides a summary of participant's biographical backgrounds: Table 1- Biographical Background Participants, Table 2 - Organisational Position (Alphabetical Order), and Table 3 – Industry Type, provide a summary of participant's biographical background and industry type.

TABLE 1: BIOGRAPHICAL BACKGROUND PARTICIPANTS

Organisation Size	Frequency	Respondent's Age	Frequency
Small (1-100 Staff)	17	20-30 Years	14
Medium (101-500 Staff)	10	31-40 Years	27
Large (501+)	39	41-50 Years	21
		51-60 Years	3
Respondents Gender	Frequency	Respondents Education	Frequency
Male	48	Grade 12 and Organisational Training Programmes	2
Female	19	National Technical Certificate(s) N4, N5, N6	1
Missing	1	B – Degree / National Diploma	36
Total	68	B Tech / Honours Degree	21
		MBA	3
		Masters - Professional	4
Manufacturing and Service Industry	Frequency	Project Management Involvement	Frequency
Manufacturing	24	Yes	41
Service	39	Limited	27
Other	5	Total	68

TABLE 2: ORGANISATIONAL POSITION (ALPHABETICAL ORDER)

Organisational Position (Alphabetical Order)	Frequency	Organisational Position (Alphabetical Order)	Frequency	Organisational Position (Alphabetical Order)	Frequency
1) Academia	2	11) Human Resources Manager	3	21) Production Manager Trainee	1
2) Administration	1	12) IT Specialist	3	22) Project Manager	7
3) Business Analyst	2	13) Legal	1	23) Quality Controller	1
4) Business Owner	3	14) Logistics / Warehouse manager / supervisor	2	24) Quality Control Chemist	1
5) Consultant	5	15) Managing Director	1	25) Quality Control Technician	1
6) Engineering manager	2	16) Marketing & Sales Management	1	26) Quality Manager / Engineer / Assurance	4
7) Factory Manager	1	17) Operation Manager	6	27) Risk Manager	1
8) Financial Management	6	18) Operational Risk Management	1	28) Supervisor / Foreman	3
9) General Management	2	19) Process Engineer	3	29) Systems Manager	1
10) Head of Fraud & Dispute, Risk Management	1	20) Production Manager	2		

TABLE 3 – INDUSTRY TYPE

Manufacturing Type	Service Industry Type
Basic iron and steel, non-ferrous metal, metal products, and machinery	Financial
Construction	Education
Food and Beverages	Environmental
Electrical machinery	Governmental
Engineering	Human Resources
Petroleum, Chemical, Rubber, Plastics	Legal Services
Radio, television and communication	Marketing
	Retail
	Warehousing

D. Development Of BPC Assessment Model

Assessing the gap between actual and desired performance is the starting point for continuous improvement projects and is an increasingly important tool when analysing business processes [18 and 27].

Benchmarking and improving performance requires a set of activities, whereby, (a) assessing the current performance, and (b) deciding the appropriate level of target performance.

To assess business processes and current performance a holistic view is required to identify interactions across the broad organisation. This forms the basis in the design of a measuring tool framework and is crucial to organisations being assessed and evaluated against multiple dimensions of performance from end-to-end. This ensures the understanding of the current state and charting out an occurrence or transformation plan focusing on continuous improvement. This action places leverage on the multifaceted nature of performance to gain a competitive edge, maximize performance, and business process capability, forcing an organisation to execute and measure an organisations BPC transformation strategy [20].

Critical to the success in the development of a BPC measurement tool is the validity and reliability of critical factors, and factor-items it intends to measure. Different forms of validity and reliability test identified and applied include [20];

- a) Validity of measuring a particular characteristic
- b) Content validity whereby the measurement instrument is a representative sample of the content area being measured
- c) Criterion validity the extent the results of an assessment correlate with another
- d) Construct validity measuring a characteristic that cannot be directly observed but is assumed to be based on the pattern of behaviour of people, and
- e) Reliability testing measuring the degree to which an instrument measures the same each time it is used.

Eleven critical (11) critical factors contributing to BPC was identified and subsequently a measurement tool framework designed represented a holistic “view” of Business Process Capability. The measuring tool framework was evaluated by experts to determine if it presents an integrated approach constituting towards Business Process Capability consisting of the following critical factors presented in Fig 1- BPC Factor Measurement Tool Framework

Critical Factor	Reference Code
a) Corporate Strategy	(Code - A1)
b) Business Strategy	(Code – A2)
c) Governance Policies and Procedure	(Code – A3)
d) Organisation Structure	(Code – A4)

- e) Business Infrastructure (Code – A5)
- f) Processes Structure (Code – A6)
- g) System and Information Structure (Code – A7)
- h) Process Optimisation (Code – A8)
- i) Process Improvement (Code – A9)
- j) Process Review (Code - A10)
- k) Standards and Measurements (Code - A11)

Factor Analysis is critical in designing any model as it describes the covariance relationship amongst several variables in terms of a few underlining, unobservable random quantities and is a collection of techniques used to examine how underlying constructs influence the responses on a number of measured variables, [6], [25].

The author utilised various statistical analysis tools testing the relevancy, validity, and reliability in the design of a final comprehensive measurement tool framework required to measure the readiness of an organisation to implement and maintain Business Process Capability.

The BPCM factor and factor-item assessment model entails a five factor-Likert scale method of scoring enabling the organisation to analyse and grade itself against a specific scale or criteria by means of gap analysis. Factor and factor-items were rated according to a summated Likert Scale and participants evaluated and rated the degree of relevancy of Critical Factors (Phase 1 of study) and gap analysis factors-items (Phase 2 of study). This provided a meaningful

accepted criterion for Critical Factors as well as measurement of prioritised factor– items versus actual occurrences taking place in an organisation, (Phase 2 of the study), [9, and 18].

E. Relevancy, Validity, And Reliability Testing And Analysis

1. Industry type

Due to the wide variety of participants from manufacturing or service industry the Mann Whitney-U and Wilcoxon test was applied to determine if there is any significant difference between the two respective industry groups with respect to Critical Factor (Phase One) and factor-items (Phase Two). This is an important criterion as it is many times assumed that different criteria are applied when measuring business process capability for different type of industries involved.

Results of the Mann Whitney-U and Wilcoxon Test using SPSS indicate that there is no significant difference between manufacturing industry and service industry with regard to the eleven (11) Critical Factors (Phase 1) and all factors-items (Phase 2) relevant to BPC.

It can be assumed that all eleven (11)-relevancy factors are reliable and valid to any type of Industry. This confirms that the BPC model will be able to determine the readiness of any organisation to implement BPC in any type of industry. See Table 4 - Mann Whitney Test and Organisation size.

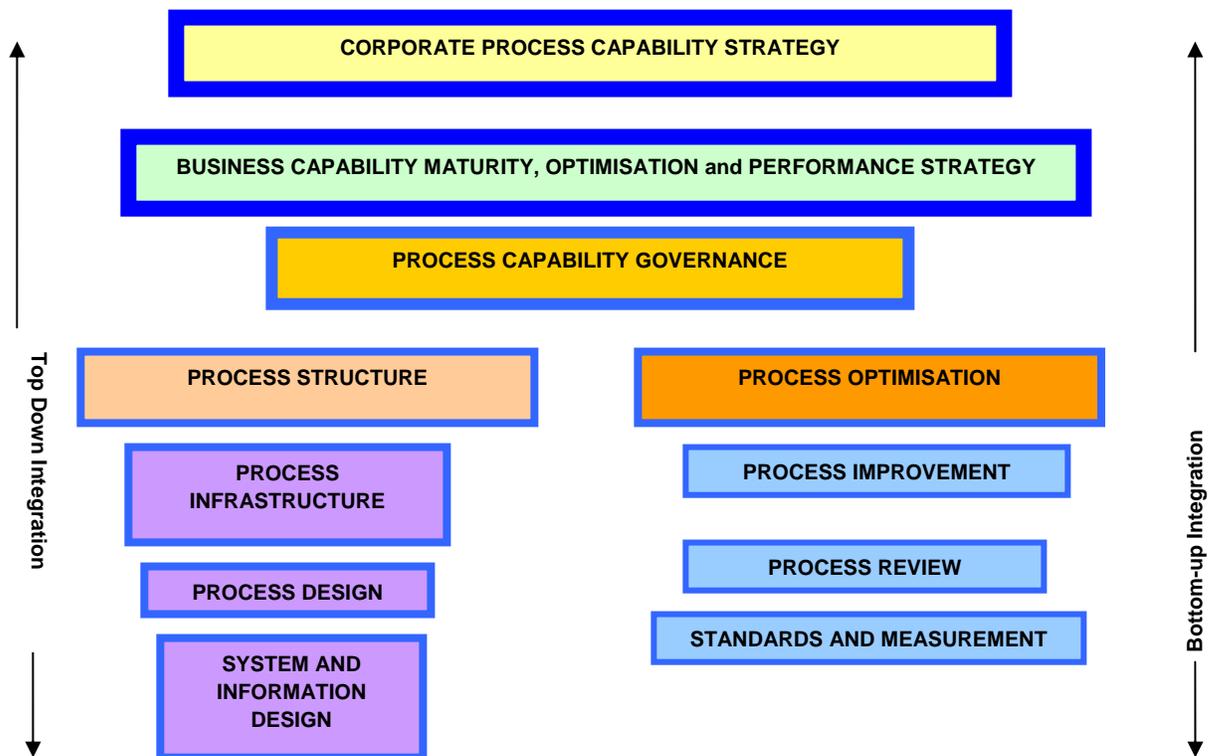


Figure 1 - BPC Factor Measurement Tool Framework

TABLE 4 - MANN WHITNEY-U AND WILCOXON TEST AND ORGANISATION SIZE

SPSS - Manufacturing and service industry		Frequency	Percent
Factor mean: Critical Factors BPC	Manufacturing	24	35.3
	Service	39	57.4
	Other	5	7.4
Test Statistics	Mean Factor mean: Critical factors BPC	Organisation Size	Frequency
Mann-Whitney U	355.500	Small (1-100 Staff)	17
Wilcoxon W	1135.500	Medium (101-500 Staff)	10
Z	-1.594	Large (501+)	39
Asymp. Sig. (2-tailed)	.111		

2. Critical Factors BPC

Expert in the field of BPC subjected all eleven (11) Critical Factors to evaluation in order to construct relevancy, convergent relevancy, validity, reliability test focusing on the most critical factors identified contributing, and ensuring control over the total business processes functionality in an organisation.

Relevancy, validity, and reliability of Phase 1 were determined by Cronbach's Alpha reliability coefficient test using SPSS. The result output for the set of eleven (11) items in Section A indicated an overall Cronbach's Alpha of $\alpha = 0.954$ indicating a good internal consistency (rule of thumb alpha is that alpha should not exceed > 0.80) between Critical Factors in the scale. Therefore all eleven (11) Critical Factors measured is according to the underlying (or latent) construct and displays an inter-correlation Cronbach's Alpha measurement of validity and reliability, and relevancy. Table 5 shows the results of the combined Factor Analysis Correlation Matrix and Cronbach's Alpha for Section A.

Further statistical analysis using SPSS was conducted determining the relevance, validity, and reliability of Critical Factors in terms of:

- (a) Item Discrimination (criteria measuring difficulty of understanding and applying items) varied from 0.636 and 0.877. I can be assumed that no factor or factor- item was difficult to understand, and
- (b) Kaiser – Meyer – Olkin and Bartlett's Test measuring the sampling adequacy index and appropriateness of factor analysis for each variable associated with factor and factor-item. The results observed indicated a KMO value of 0.872 and is considered a good indication that the components or factor analysis is useful for variables under review and that no variables require corrective action either deleting the "offending variables" or including other variables related to the offenders.

Note: - It is proposed by IBM that if KMO values are inadequate if less than < 0.5

In conclusion, all eleven Critical Factors fulfilled the criteria of relevancy, validity, and reliability and can be used as part of the BPC measuring model.

TABLE 5: COMBINED FACTOR ANALYSIS CORRELATION MATRIX AND CRONBACH'S ALPHA

FACTOR ANALYSIS – RELEVANCE CORRELATION MATRIX												Total Statistics			
CODE	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	Scale Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
A1	1.00	0.73	0.62	0.51	0.51	0.49	0.54	0.51	0.49	0.54	0.43	38.22	100.54	0.636	0.954
A2	0.73	1.00	0.57	0.68	0.76	0.67	0.59	0.73	0.59	0.65	0.59	38.24	95.275	0.788	0.950
A3	0.62	0.57	1.00	0.53	0.55	0.52	0.41	0.51	0.62	0.54	0.55	38.54	98.616	0.639	0.955
A4	0.51	0.68	0.53	1.00	0.81	0.71	0.69	0.82	0.81	0.78	0.72	38.52	93.284	0.864	0.947
A5	0.51	0.76	0.55	0.81	1.00	0.85	0.74	0.76	0.78	0.69	0.71	38.60	92.123	0.877	0.946
A6	0.49	0.67	0.52	0.71	0.85	1.00	0.74	0.65	0.69	0.61	0.69	38.79	91.986	0.804	0.949
A7	0.54	0.59	0.41	0.69	0.74	0.74	1.00	0.71	0.61	0.68	0.59	38.78	94.328	0.761	0.951
A8	0.51	0.73	0.51	0.82	0.76	0.65	0.71	1.00	0.79	0.76	0.69	38.60	93.062	0.842	0.948
A9	0.49	0.59	0.62	0.81	0.79	0.69	0.61	0.79	1.00	0.81	0.74	38.70	92.970	0.845	0.948
A10	0.54	0.65	0.54	0.78	0.69	0.61	0.68	0.76	0.81	1.00	0.75	38.88	93.349	0.826	0.948
A11	0.43	0.59	0.55	0.72	0.71	0.69	0.59	0.69	0.74	0.75	1.00	38.76	94.306	0.782	0.950
												Cronbach's Alpha - Reliability Statistics		N = 11 Cronbach's Alpha = 0.954	

3. Phase 2 - Priority and Occurrence Factor-Items

The objective of this section is to develop a comprehensive self-assessment and measurement model focusing on a broad spectrum of critical factors-items and sub-items contributing towards BPC.

This section focuses on the Critical Factors identified as guiding principles contributing towards the measurement and application of Business Processes Capability within an organisation. It comprised factor-items and sub factor-items being prioritised and measured against occurrences in an organisation according to a Likert-scale. When critically analysed a gap transpire between what organisations perceive as a priority versus what actually occur in the organisation. Section B thus provides a measuring tool to determine the readiness of an organisation to implement BPC.

In total Phase 2 of the study consisted of a comprehensive set of one hundred and sixty five (165) priority measurable factor- items and on hundred and sixty five (165) occurrence factor- items.

The hundred and sixty-five priority (165) factor-items and hundred and sixty-five (165) occurrence factor items focused on the following criteria:

- a) Corporate Strategy, Business Strategy, and Governance Policies and Procedure formulation;
- b) Organisation Structure, financial management, roles and responsibilities, management, BPC steering committee, process ownership, project teams, consultants, stakeholders, policies and procedures, people management, Measurement Of Staff Performance, and Communication;
- c) Business Infrastructure, processes structure management, process modelling / mapping / process, standards of

process models, quality control, and change and version control;

- d) System and Information Structure, Modelling Tools, Process Implementation, Process Storing Process and Facility, Links to other systems, Publishing of Documents, and Change Management Control;
- e) Process Optimisation, process improvement, process review, process optimisation vision and strategy, process optimisation as part BPC strategy plan, process optimisation strategies, process improvement strategies, process performance objectives, customer satisfaction and competitiveness;
- f) Standards and Measurements to evaluate and assess business processes against appropriate standards, process capability project management principles, process improvement models, Total Quality Man (TQM), Lean Processes, Business Process Re-engineering (BPR), Six – Sigma, Cause- effect Diagrams, Risk management;
- g) Organisation process review program, life cycle improvement and optimization, business units and process owners review plan, continuous improvements in business processes, workforce and review of enterprise-wide core processes, integrated work plan, improvement phase, new process implementations and post implementation assessment, and feedback on measurement aspects to management;
- h) Process standards and measures , process and product design

Table 6 shows a schematic coding system of Phase 2 of the study displaying Priority Factor-Items and Occurrence Factor-items used in the measuring BPC model.

TABLE 6: PRIORITY FACTOR-ITEMS AND OCCURRENCE FACTOR-ITEMS.

CODE	Factor Criteria	Phase 2 - Number Of Items Per Criteria	Priority Factor- Item Code	Occurrence factor – item Code
B1	Corporate Strategy	5	B1.1.1 – B1.5.1	B1.1.2 – B1.5.2
B2	Business Strategy	4	B2.1.1 – B2.4.1	B2.1.2 – B2.4.2
B3	Governance Policies and Procedure	4	B3.1.1 – B3.4.1	B3.1.2 – B3.4.2
B4	Organisation Structure	4	B4.1.1 – B4.4.1	B4.1.2 – B4.4.2
B5	Business Infrastructure (Critical items consist of sub-items)	50	B5.1.1 – B1.15.1	B5.1.2 – B5.15.2
B6	Processes Structure (Critical items consist of sub-items)	22	B6.1.1 – B6.6.1	B6.1.2 – B6.15.2
B7	System and Information Structure (Critical items consist of sub-items)	11	B7.1.1 – B7.8.1	B7.1.2 – B7.8.2
B8	Process Optimisation (Critical items consist of sub-items)	13	B8.1.1 – B8.5.1	B8.1.2 – B8.5.2
B9	Process Improvement (Critical items consist of sub-items)	25	B9.1.1 – B9.4.1	B9.1.2 – B9.4.2
B10	Process Review (Critical items consist of sub-items)	5	B10.1.1 – B10.5.1	B10.1.2 – B10.5.2
B11	Standards and Measurements (Critical items consist of sub-items)	22	B11.1.1 – B11.21.1	B11.1.2 – B11.21.2
	Total number of items	165		

TABLE 7 – PRIORITY AND OCCURRENCE CRONBACH'S ALPHA

Internal Code	Cronbach's Reliability and Validity Factor and Item Analysis -Summary	Number of Items per factors	Company prioritise activities - Cronbach's Alpha	Rate of occurrence - Cronbach's Alpha
B1	Corporate Strategy	5	0.917	0.898
B2	Business Strategy	4	0.90	0.872
B3	Governance Policies and Procedure	4	0.934	0.683
B4	Organisation Structure	4	0.920	0.907
B5	Business Infrastructure (Critical items consist of sub-items)	49	0.986	0.957
B6	Processes Structure (Critical items consist of sub-items)	22	0.946	0.974
B7	System and Information Structure (Critical items consist of sub-items)	11	0.963	0.842
B8	Process Optimisation (Critical items consist of sub-items)	13	0.974	0.960
B9	Process Improvement (Critical items consist of sub-items)	25	0.985	0.982
B10	Process Review (Critical items consist of sub-items)	5	0.950	0.967
B11	Standards and Measurements (Critical items consist of sub-items)	22	0.987	0.967
	Total number of items	165		

4. Priority and Occurrence Testing - Validity and Reliability

All priority factors-items and occurrence factor-items were subject to significant test, construct validity, convergent validity and discriminant validity tests. Using SPSS all factor-items were subjected to Cronbach's Alpha validity, reliability, and correlation analysis and was subsequently accepted as valid, reliable. The results of Cronbach's Alpha are represented in Table 7: Priority and Occurrence Cronbach's Alpha.

Further statistical analysis of the BPC measurement model included:

- (a) Inferential Statistics for all Critical Factor and factor-items measuring the mean, mode, median, and standard deviation with a 95% Confidence Interval (Lower Bound and Upper Bound), Variance analysis, Interquartile Range, Skewness, and Kurtosis.
- (b) Spearman Correlation technique testing the direction and strength of the relationship between two or more variables therefore showing whether any one set of numbers has an effect on another set of numbers [20]
- (c) Kaiser –Meyer Olken Measure (KMO) and Bartlett's statistic measuring the Sampling Adequacy correlation index of the appropriateness of factor analysis for overall statistics and is applied comparing Relevancy of Critical Factors as well as priority and occurrence ratings (gap analysis), [21]
- (d) Mann-Whitney U-Test applied comparing priority and occurrence ratings when the data is ordinal rather than interval of nature (gap analysis) [21]
- (e) Kendall's tau-b and Spearman R were applied to determine Pearson correlation coefficient by means of ranking the correlation whilst Kendall tau presented the probability when determining the difference between the probability of the observed data are in the same order

for two variables versus the probability that the observed data are in different orders for the two variables [15]

Final analysis of results obtained concluded that all hundred and sixty-five factor-items (165) factors and factor-items fulfil the criteria of relevancy, validity, and reliability and used as a measuring tool to measure the readiness of an organisation towards BPC.

III. CONCLUSIONS AND RECOMMENDATIONS

The abundance of information on BPC-modelling evident during the study emphasises the importance of BPC. Measuring the readiness of BPC as a tool increases the efficiency, reduce quality costs, improve business process effectiveness and ensure continuous improvement, as well as harmonising business processes [22]. Only limited results are highlighted in this paper to emphasize the importance of a measuring tool to determine the readiness of an organisation BPC initiative.

The measuring tool clearly highlights the importance of total integration of all business processes. It also emphasize the importance that BPC starts installing and alignment of strategies focusing on: (a) corporate business process capability; (b) business capability maturity; (c) optimisation and performance; (d) corporate governance; (e) business process structure; (f) process optimisation; (g) continuous improvement, and (h) application of effective standard measurements. [5]

Measuring BPC is a constant reminder of organisational behaviour to management and employees. Continuous improvement forces business process optimisation initiatives to drive organisations in a pursuit for performance and

excellence. This is only achievable if everybody has a knowledge and understanding of what BPC really wants to achieve.

BPC also emphasise that all stakeholders and suppliers should take a total integrated approach. It is top down, bottom up driven strategies, and requires that BPC strategies translate into business plans in every unit as a high priority translating into action by every business unit [4 and 27].

Further more organisations should firstly establish the validity and reliability of all factors viewed as representative of their internal measurement tool in order to determine the readiness of an organisation when implementing BPC.

Adhering to the above will ensure that organisations focus on critical factors and items rather than simply embarking on a road of continuous improvement towards BPC.

A brief summary of the study results revealed the following:

- a. Corporate and Business Strategy (B1)

Seventy nine percent (79%) of the participants as high to essential prioritised the commitment by top management towards BPC. However, this does not seem to be happening as only sixty two percent (62%) of the participants indicated that this does in fact happen, raising a concern that BPC is not really perceived as important as a corporate strategy by top management.

Further concerns as displayed in Table 8 – Corporate and Business Strategy shows there is a distinct gap between high to essential priority versus what actually occur when considering corporate and business strategy.

Key to the success of BPC is that leaders and management should set an example. Only fifty four percent (54%) of the participants in the study indicated that top management often to always set an example towards BPC. This however should not be as top management is the driver of all continuous improvement programmes such

as, Business Process Improvement, Total Quality Management, Business Process Review and Lean implementation programmes. This might be the reason why so many continuous improvement programmes fail as top management do not set an example or is committed.

- b. Business Strategy

Business Strategy (BS) and BPC strategy aligned with strategic decisions concerning the choice of products, meeting needs of customers, gaining advantage over competitors, creating new opportunities and converting Corporate Strategies into tactical and operational BPC. This enforces a company wide management strategy as part of corporate business quality strategy [22]. This clearly is not the case when analyzing business strategy factors-items aligned to BPC and concerns raised when evaluating the gap displayed in Table 9- Business Strategy aligned to BPC.

The above result illustrates the impact on companywide BPC and quality improvement initiative highlighting the importance that BPC should be a part of a business strategy drive.
- c. Governance

Governance policies and procedures are defined, monitored, and controlled as part of BPC initiative. Compliance of Business Processes Capability standards measured via formal assessment practices whilst process capability governance regulations are defined and integrated into the enterprise governance process. Important to governance is that a formal reporting process must be in place supported by processes to rectify non-compliance supported by guidelines and utilisation of resources to facilitate collaboration and communication. Table 10 illustrate the results and importance of governance and standards within an organisation.

TABLE 8 CORPORATE AND BUSINESS STRATEGY

Factor Items	Priority - High to Essential (%)	Occurrence - Often to always (%)
Balancing the needs and expectations of all stakeholders	74	44
Business Process Capability Strategy and supporting policies are reviewed, updated and improved	66	43
Enterprise wide evaluation of people's awareness of the BPC strategy	79	18
Company Wide Quality Management (CWQM) is part of the Corporate business quality strategy and goals	63	54
Top management model processes and set example thereof	63	54

TABLE 9 BUSINESS STRATEGY ALIGNED TO BPC

Factor Items	Priority - High to Essential (%)	Occurrence - Often to always (%)
Business Processes Capability strategy are translated into strategic business plans in every business unit	64	43
Company Wide Quality Management (CWQM) is part of the Corporate business quality strategy and goals	63	54
The business strategy and BPC are aligned	57	35
The entire organisation supports the BPC - strategy to achieve overall business strategy	59	34
Compliance of Business Processes Capability standards are measured via formal assessment practices	65	43

TABLE 10 GOVERNANCE

Factor Items	Priority - High to Essential (%)	Occurrence - Often to always (%)
Compliance of Business Processes Capability standards are measured via formal assessment practices	65	43
Processes Capability governance regulations are defined and integrated into the enterprise governance process	62	32
The organisation formally approves and maintains organizational structure towards process optimisation	72	56
Process governance is supported by guidelines and utilisation of resources to facilitate collaboration and communication	63	44

Of concern is that forty-three percent (43%) of the participants indicated that process governance is often to always be measured via formal assessment practices and that only thirty-two percent (32%) of the time integrated into the enterprise governance system. Governance can only be assured if supported guidelines, utilisation of resources, collaboration, and communication by all employees and stakeholders.

d. Business Processes Measurement and Readiness

This study provided sufficient evidence that BPC include more than only process enhancement and that organisations be measured in terms of readiness before embarking on a road of process improvement or applying business optimisation tools such as TQM, Lean, and Business Process Re-engineering (BPR).

A great concern is the awareness of people towards BPC. The study clearly shows that people are not aware of BPC initiatives and does not fully understand the necessity or the importance thereof thus a limited understanding of concepts and importance of BPC contributing to all levels in the organisation.

It is a concern when seventy nine percent (79%) of the participants indicated that BPC awareness never, rarely or sometimes exist in organisations. It is impossible to successfully implement and sustain continuous improvement programme, such as, BPI, TQM, Lean, or BPR in an organisation if the above is the case.

Even more of a concern revealed in the study is that organisational structures do not support BPC analysis. It is essential that after any type of continuous improvement initiatives policies and procedures are evaluated and addressed and at the same time organisational structure be adjusted. Results obtained in the study indicate that fifty seven percent (57%) of the time this never to sometimes occur, suggesting that organisations do not change their organisational focus or that management being committed to bring about change.

e. Quality as Corporate Strategy

All organisations want to excel and have quality as a high priority. To achieve high quality, organisations must ensure that they are driven by corporate business quality strategy and goals. Sixty three percent (63%) of the participants indicated quality as high to essential as part of corporate strategy. However, results show that fifty-four (54%) of the time quality, never, rarely or sometimes materialises as part of corporate strategy.

f. Policies, Procedures, and Regulation

Policies, procedures, regulations, and goals statements should be defined and developed for every business process. What is of concern is that only forty one percent (41%) of the participants indicated that policies, procedures, regulations and goals are developed and defined in their organisations, whilst forty percent (40%) of the time awareness, understanding and compliance to policies, procedures, and regulations are measured on a regular basis.

g. Training and Development

Training, development, performance and capabilities of employees is the backbone of any organisation and employees must be assessed and measured against agreed criteria and contracted critical performance areas.

According to participants, obtaining new skills and knowledge at their organisations are prioritised high to essential at sixty two percent (62%).

What is of concern is that only forty percent (40%) of the participants indicated that their organisations often to always have a comprehensive education and training strategy in place, supported by detailed training programs focusing on individual and corporate needs.

h. Process Optimisation and Quality Cost (B8)

Process optimisation strategy focussing on process performance objectives must ensure customer satisfaction, competitiveness, and quality. Essential to process optimisation is the measurement of the cost of quality and includes end-to-end processes. Do be effective all stakeholders must understand the “principles” of cost of quality.

Results of the study show that organisations pay very limited attention to process optimisations and cost of quality. Forty four percent (44%) of the participants indicated that their organisations acknowledges the impact process optimisation have on customer satisfaction of whom sixty one percent (61%) indicated that their organisation prioritise high to essential the achievement of error free goods or service. However, forty nine percent (49%) of the participant has indicated that their organisations do measure the cost of quality whilst admitting that only forty four percent (44%) of all stakeholders understand and apply quality costs principles.

i. Business Process Improvement (B9)

Processes improvements are continuous and joint undertaking between staff, process owners, business units, and other stakeholders and should focus on end-to-end processes. This requires that all stakeholders continuously focus identifying process improvement opportunities and that management attention must focus on the execution and sustainability of improvement programs in terms of quality, speed, dependability, flexibility and cost [28].

Process improvement initiatives must therefore be performed according to project management principles focusing on resources capabilities towards desired outcomes. Improvement projects must be part of business process capability projects and organisations must adapt tested improvement models, approaches, and methodologies supported by recognised process analysis- and improvement techniques to ensure scientific process improvement solutions [11 and 23].

Process improvement techniques must be part of the organisations objective to ensure process improvement, as it is the basis and an integral part of all Business Process Capability improvement initiatives. [17]. Models techniques include:

- Total Quality Man (TQM)
- Lean Processes
- Business Process Re-engineering (BPR)
- Six – Sigma
- Risk management
- Risk assessment of the supply chain vulnerability be conducted

Results show that organisations neglect the importance of continuous improvement programmes. Forty three percent (43%) of the participants indicated that their organisations involve in a joint undertaking between staff, process owners, business units, and other stakeholders whilst forty four percent (44%) indicated that their organisations embark in projects involving business process improvement.

Process improvement initiatives must be performed according to project management principles to ensure a focus of resources and abilities towards the desired outcome. The study has shown that only Sixty six percent (66%) of the participants indicated that their organisations see process improvement projects as high to essential. However, forty three percent (43%) indicated that these projects are never, rarely or sometimes effective.

Process improvement requires a recognized process analysis- and improvement techniques to ensure scientific process improvement solutions [26]. What is of a concern is that sixty five percent (65%) of the participants indicated that process improvement techniques to be high to essential opposed to thirty six (36%) indicating that the improvement techniques is actually supported by process improvement solutions.

Further results obtained in the study as illustrated in Table 11 show that only a limited number of organisations apply the following process improvement techniques or models effectively.

j. Process Review Cycle (B10)

Organisation must have an overall process review program managing the life cycle of improvement and optimisation. Fifty percent (50%) of the participants indicated that their organisation often to always have a review programme in place whilst thirty two percent (32%) indicated that the workforce have a bigger picture regarding the review cycle. What is of importance is that individual business units and process owners review plans should focus on implementing a significant continuous improvements programme to processes and at the same time emphasising that the workforce must have a bigger picture regarding review of enterprise-wide core processes [26].

Of importance is that an integrated work plan must be enforced ensuring that sufficient feedback is provided to management regarding the review of processes by stakeholders. Feedback must also occur during improvement phases on all new process implementations and post implementations. Results of the study unfortunately show that only forty percent (40%) of the time sufficient feedback is provided to management. This in it self is a major problem as management can only lead, plan, organise and control if sufficient feedback is provided to them.

k. Performance Standards Measurement (B11)

Performance standards and compliance principles must be determined and included at all stages of the business process and performance standards. The responsibilities of stakeholders concerning critical business processes must be well communicated and clearly understood by all stakeholders. Of importance is that measurements of process performance should involve all stakeholders and are performed focussing on end-to-end quality of all processes, including financial, operational, customer, supplier, and organizational criteria.

TABLE 11 BUSINESS PROCESS IMPROVEMENT TECHNIQUES.

Factor Items	Priority - High to Essential (%)	Occurrence – never to sometimes (%)
Total Quality Man (TQM)	64	57
Lean Processes	60	52
Business Process Re-engineering (BPR)	60	56
Six – Sigma	56	57
Risk management	62	44
Risk assessment of the supply chain vulnerability	64	49

Process capabilities of suppliers and requirements of customers must be understood in terms of all aspects of process performances. Important is that supply chain objectives are clear so that each process and product design throughout the chain contributes towards a mix of quality, speed, dependability, flexibility, and cost. This ultimately involve risk assessment of supply chain vulnerability and measure operations capacity balancing processes variation based on demand and capacity.

An important observation is that process capacity utilisation and performance measurement results must be available in order to achieve lean synchronisation. Other critical criteria considered are as follow:

1. Resource planning and control system interface with customers
2. Resource planning and control system interface with suppliers
3. Resource planning and control information is integrated
4. Lean Synchronisation applied throughout the supply network and understood within the organisation
5. Waste caused by variability and quality is calculated for all operation processes
6. Inventory information system should integrate all inventory decisions
7. JIT principles are explored and applied
8. Little's Law is understood and applied
9. Methods of reducing waste and inventories are to be explored
10. Bottlenecks should be identified and their effect on smooth flow of items through operations and processes be evaluated

IV. CONTRIBUTION OF THE STUDY

Despite the abundance of BPC models, limited studies have been done on a measurement tool to determine the readiness of an organisation to implement BPC in the entire organisation. This includes end-to-end process optimisation, corporate and business strategy, management environment, business structure, business processes, people and process improvement strategies.

From the results obtained a theoretical construct of a model to measure the readiness of an organisation to implement BPC. All factors and factor items identified in the design of the measurement tool were viewed as valid, reliable, and thus acceptable to be used as a measuring tool to determine the readiness of an organisation to implement BPC.

The findings and results obtained from this study undertaken add valuable new perspective to BPC as a critical requirement to obtain capability within an organisation. The measurement tool developed is able to measure the existing level of capability of the organisation by means of gap analysis and identify the status of functionality within different business units of an organisation. This model also

indicates the readiness of an organisation to implement BPC even though they have adopted, TQM, Lean, BPR, and Six-Sigma, Risk Assessment techniques as process improvement tools or models.

In conclusion, it is evident that South African organisations are increasingly feeling the strain to remain competitive in an ever-changing global economy. The study undertaken develop a holistic measurement model to determine the readiness of an organisation to implement BPC on a strategic and tactical level enables management to identify strengths and weaknesses within their organisation and or business units.

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