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Business Process Re-Engineering in Public Administration of Kingdom of Saudi Arabia

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***Abstract*—**The government of Saudi Arabia is in the phase of transformation. Business process reengineering (BPR) can play a vital role in assessing this conversion. BPR methodologies provide ways to optimize the use of resources while maintaining high-quality services. The aim of this paper is to investigate the introduction of BPR in Saudi Arabia public sector. A framework is proposed to transform change using a knowledge based. The proposed solution is validated through survey. The results of the survey show that Saudi Governmental Agencies acquire the power to implement the BPR successfully especially if it is implemented with knowledge management and the BPR movement started at small scale.

***Index Terms*—**BPR, Saudi public administration, t-government, knowledge management.

I. Introduction

Public administration in Saudi Arabia dates back many decades. It was built in a hierarchal fashion and central management. The public services they offer are highly bureaucratic. Bureaucracy affects the quality of services in terms of the delay and performance. Public sector organizations especially those in developing countries are having enhancement problems due to bureaucracy, lack of duty focuses, and depravity [1]. The Saudi government has started using the e-government to provide better quality of services. However, the operations in the e-government are merely a reflection of the actual bureaucratic operations. Therefore, government agencies should radically re-engineer their processes to realize a marked improvement in their performance. Business process re-engineering (BPR) provides an excellent opportunity to improve process performance, provide better customer service and preferable administration of resources[2]. BPR principles are valuable in transforming government operations; that has made BPR profoundly related to transformational e-Government implementation. Transformational government t-government is seen as the next phase of e-government, and [2]. Transformational e-government is expected to provide a citizen-centric relationship with a reactive government which will increase citizen satisfaction and trust in the government [3].

BPR was defined as "the fundamental rethink and radical redesign of business processes to generate dramatic improvements in critical performance measures such as cost, quality, service and speed"[4]. It has frequently been used since it was firstly introduced in the United States in the 1990s. The BPR activity requires identifying and analyzing the current business processes and then redesigning these processes in a more efficient manner. It might also require organizational restructuring [5]. BPR success has proven to be difficult in the private sector, and even more difficult in the public sector [6]. It depends on the BPR techniques and tools [7]. BPR movement is driven by visions, customer satisfaction, expenses cuts and efficient use of resources. BPR activities start at the bottom of the organization, from the clients and workers to the top management [4]. BPR ultimate goal is to optimize the entire productivity of the organization. Developing countries are taking the initiative to implement BPR in public administration. UAE started the BPR in its public sector, and it results in better performance, cost saving, and customer satisfaction [8].

This paper investigates the introduction of BPR integrated with knowledge management to the public administration in the Kingdome of Saudi Arabia. The rest of the paper is organized as follows. Section II, the related work is discussed. Section III, the problem statement is stated. Section IV, the proposed solution is illustrated. Section V, the proposed solution is validated to conclude the results.

II. Related Work

Weerakkody et al. [2] aimed to utilize the findings of Business process Reengineering (BPR) movement in e-government to apply them in the public sector. Two case studies were conducted to evaluate the authenticity of the findings. One of the case studies was conducted in a large scale government department of London and the second case study was arranged in a large municipality of Netherland. The results of case studies showed that t-Government can benefit from BPR movement. While considering some different aspects such as bottom-up participation, plans for radical changes and incremental progress. The findings of Weerakkody et al. [2] research can be used to start the development of BPR approach for t-Government. However, the research investigated only two case studies, and the results cannot be generalized.

In [9], a BPR case study was conducted in a the way which the civil service agency used to implement the

human resource information management system at the personal board of Jefferson County Alabama. Implementation of the human resource information management system through BPR was considered a critical way to perform the required change. The BPR process gone through the following five phases: scoping and planning visioning, design, construction and implementation. The study provided valuable lessons on how to guarantee a smoother implementation of the human resource information management system to public sector organizations. Nevertheless, the study did not give any performance or quality measurements.

Cheng et al. [10] combined knowledge management and business process reengineering to develop a knowledge management oriented BPR. The model analyzed the knowledge that was obtained from the process daily operational routine and used it as a knowledge base to the business process reengineering. The model was performed on a real process in a construction firm. There was an improvement in the process performance and the service efficiency in the firm after the model was implemented. The model did not provide any insights on how it would be carried out in public sector. Moreover, the model needed to be investigated through practical applications.

A model was proposed for re-engineering the election process to the union general elections in India [11]. The proposed system could have a positive impact on the governmental sector as well as on the citizens. However, the samples were collected from the registered candidate, and the study was based on a non-experimental survey.

Rinaldi et al. [12] proposed a public administration BPR approach in Italy. A simulation model was added to the BPR approach, which was used for performance evaluation. There was an improvement in the levels of efficiency in the public administration, according to the findings of the study. However, the results could not be generalized as the study was conducted only to a specific public administration.

Another approach was aligning enterprise resource planning with BPR [13]. The integrated approach provided a significant improvement in terms of profitability and sustainability. The proposed approach was validated through an Indian Capital Goods industry. The case study showed that synergizing BPR with enterprise resource planning during the planning and execution phase was tough. However, synergizing BPR with enterprise resource planning with the objectives of business transformation was the best way to do. Still, there were not much work done in that approach, and further investigation should be done to validate the approach.

An attempt to re-engineer the open government was proposed [14]. The research started by breaking down the three top pillars of the open government into its core component. Then the open government was reengineered into these four main dimensions: transparency, accountability, collaboration, and empowerment. The proposed model was validated through an empirical test. The results of the test indicated that these dimensions were suitable, and the regression analysis predicted that the Jordanian government is willing to use e-government website by a coefficient of determination equals to 0.409 which is acceptable. However, the sampling process was not entirely random, and the validating methodology was based on a survey and statistical inferences.

Fragoso [15] presented a study on the findings from the implementation of BPR in two Mexican ports. The study confirmed that BPR is a good technique to be used in improving the management of public agencies. The study also showed that BPR implementation will vary from one organization and the other and cannot be transformed. However, the study did not provide risk analysis or failure mitigation strategies.

A case study of BPR in the public sector was presented for the California welfare agency [16]. The findings of the study were that the reengineering process required intensive work from the personals and reduced autonomy. Moreover, the customers experienced decreasing in service quality. The negative study outcomes were because public sector is under budgetary pressure. A limitation of the study was identified that there were no interviews with the managers to understand how they acted in terms of prioritizing, quantitative, efficiency, and service quality.

Dubey et al. [17] developed a conceptual model by identifying the critical success factors for the implementation of BPR in government manufacturing unit. The research studied the interrelations among critical success factors to BPRs. The result of the empirical analysis showed that there was a positive impact of the critical success factors to the overall performance of the government units. There was inconsistency in the critical success factors implementation due to the obstacles in which the government agency run. The study did not use any quantities analysis methods.

SAP methodology was applied to the local administration project in [18]. The introduced methodology required implementing the SAP Business One to run all the operation of the local government before it was used and applied. This method allows adding or altering a new business process due to its flexibility. The approach did not define how it can be implemented to e-government.

An application of the RFID-enabled BPR was developed in [19] for a hospital in Singapore. The re-engineering conceptual models were developed and analyzed to minimize the risk of RFID implementation. The model was applied using ARENA simulation to a case study. The findings of the study were positives and showed improvement in the process flow. A limitation of the study was that the assumptions about the way the process was run in the case study were slightly different from the actual way it was run.

Public Sector Undertakings was investigated in [20]. The study identified 12 factors that may affect the performance of the Public Sector Undertakings. The research was done by analyzing the performance of the case study for over 12 years and estimating the

performance improvement measurements. The estimated possible average performance improvement was found to be 57.55% of the 12 factors. Nevertheless, the research result was estimated, and it needed to be measured after the implantation of the BPR for more realistic results.

Table 1. Summary of the related work

Paper Title	Limitation
Transformational change and business process reengineering (BPR): Lessons from the British and Dutch public sector [1].	The findings of the study cannot be generalized as the research only investigates two case studies.
Implementation of an HRIMS at the Personnel Board of Jefferson County, Alabama A Case Study in Process Reengineering [2].	The study did not provide any performance and quality measurements
KM-oriented business process reengineering for construction firms [3].	The model did not provide any insights on how it would be implemented in public sector.
Reengineering Government Process of Elections by Introducing Unemployed Ad Hoc Work Force Registered through Employment Exchanges in India [4].	The model was based on a non-experimental survey.
Improving the efficiency of public administrations through business process reengineering and simulation A case study [5].	The result of the study can't be generalized as the study was conducted only to a specific public administration.
Synergizing Business Process Reengineering with Enterprise Resource Planning System in Capital Goods Industry [6].	There were not much work done in that approach and further investigation should be done to validate the approach.
Reengineering the open government concept: An empirical support for a proposed model [7].	• The sampling process was not totally random. • The validating methodology was based on a survey and statistical inferences. • The concept of the open government was not fully investigated.
Business Process Reengineering in Government Agencies: Lessons from an Experience in Mexico [8].	The study did not provide risk analysis or failure mitigation strategies
Customer-driven management models for choiceless clientele? Business process reengineering in a California welfare agency [9].	The study is that there were no interviews with the managers to understand how they acted in terms of prioritizing quantitative efficiency and service quality.
Critical Success Factors in Implementing BPR in a Government Manufacturing Unit–An Empirical Study [10].	The study did not use any quantities analysis methods.
Local Governments-specific BPR mini-project with SAP applications [11].	The approach did not define how it can be applied to e-government.
RFID-enabled process reengineering of closed-loop supply chains in the healthcare industry of Singapore [12].	The assumptions of the way that process was run in the case study were slightly different than the actual way they were run.
Scope of Business Process Reengineering in Public Sector Undertakings [13].	The research results were estimated based on the analysis of the performance of the case study and it needed to be measured after the actual implantation of the BPR.
A Review of Success Factors and Challenges of Public Sector BPR Implementations [14].	The research did not cover all the existing literature. The research was of a qualitative nature as the classification used to construct success factors and the resulted challenges were based on the subjective judgment.
E-Governance in Developing World: Design of BPR Model for Makkah Municipality eServices [15].	The proposed system is not entirely automated as some process was done manually.

Jurisch et al. [21] studied the literature of BPR success in both the private and public sectors. Therefore, relevant success factors were identified. It was found that there were similarities between BPR success factors in both private and public sectors. The study specified the requirements and characteristics of the implantation of BPR in public sector. The research did not cover all the existing literature. Moreover, it was of a qualitative nature as the classification used to construct success factors, and the resulted challenges were based on the judgments of the authors.

A re-engineering of a legacy system was presented in [22]. A reengineered centralized system was implemented by Makkah municipality's eLicencing services. The proposed model resulted in reducing the data redundancy and producing a normalized data model. Moreover, the importance of re-engineering of legacy systems is emphasized in developing countries. However, the proposed system was not entirely automated as some processes were done manually. Table 1 shows summery of the related work.

III. Problem Statement

Public administration in Saudi Arabia is merely traditional as it is hierarchal and functional. The public

services offered to the public in a highly bureaucratic fashion. The government of Saudi Arabia has adopted the e-government movement. However, e-government usually reflects the real government. It is more like using national web portals without changing the organizational operations or the back office processes. As a developing country, Kingdom of Saudi Arabia should move to the next phase of e-government which is the t-government. Saudi public agencies should take the initiative to perform a radical change and incremental improvement [2]. The aim of this research is to investigate how BPR can be utilized in Saudi public administration to improve citizen satisfaction, efficiency, accountability, quality of service and reduce waste of resources. This research would shed some light on these research questions which rose from the literature review.

- Would public agencies initiate the BPR efforts?
- Would using knowledge management oriented process reengineering have a positive impact on the implementation of BPR in public administration [10]?

IV. The Proposed Solution

The BPR movement is moved by clients and should be evaluated from a client point of view. Early BPR project had a high failure rate, as they were taking a radical approach. In order to succeed, BPR should be integrated with another aspect of management [2]. Knowledge management can be integrated with BPR in public and private sectors [10]. Knowledge management provides a knowledge base that would keep the BPR exercise to design vision, mission, and objectives of organizations.

A. Goal 1- Ascertain the willingness of public agencies to establish the BPR efforts

Public agencies are not profitability organizations and as government agencies, they are under budgetary pressures. Moreover, their clients are choiceless citizens who do not have another service provider [9]. There are a great resistant to change from both employees and management. Management also has limited jurisdiction than in private sector [23]. However, implementing BPR in public agencies can transform its hierarchical, bureaucratic model into customer-oriented process model [5].

B. Goal 2 - Introduction of BPR in public agencies

It was found that public sector organizations can improve their process performance if

- It has the necessary BPR resources and skills.
- It has employed BPR with sufficient depth and breadth.
- It has provided pre-BPR requirements set of skills, systems, and technologies.
- It has successfully mitigated the impact of BPR implementation problems [23].

C. Goal 3 - Implementing BPR integrated with knowledge management

In contrast to the private sector, pubic sector organizations are likely to be willing to share their experience and knowledge, as they are not competing, and they are all serving under the same central management [21]. Organizational processes vary based on organizational and geographical culture, which makes it even more necessary to incorporate knowledge management in the BPR [24].

The BPR implementation goes through two phases: Knowledge management phase and process re-engineering phase and they are overlapping.

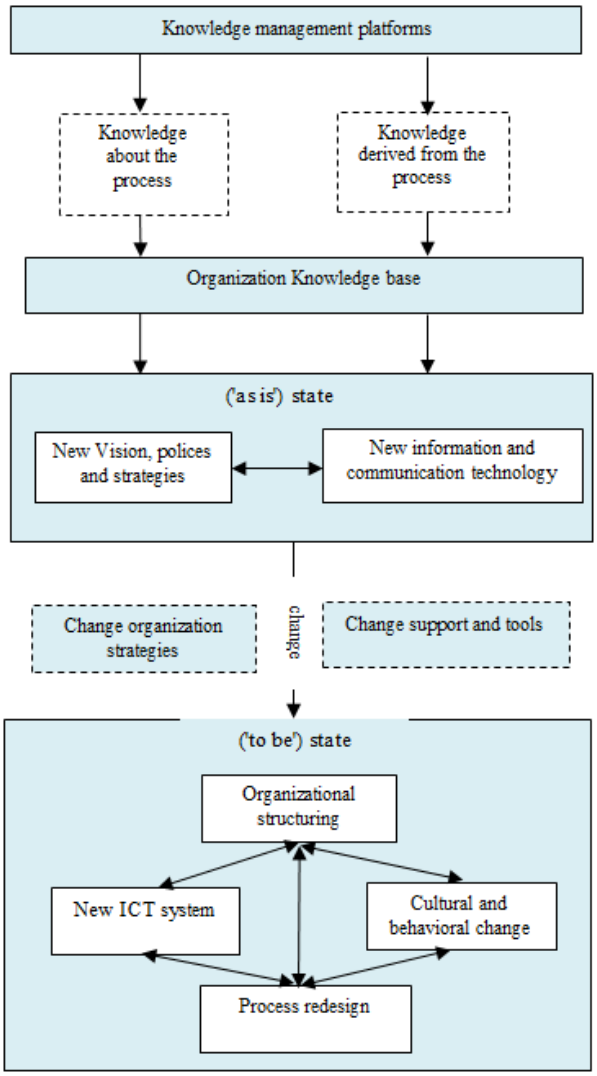

Fig.1. Knowledge based process transformational change.

Knowledge management is important to public agencies because of these features:

- *Globalization of business* governmental organizations is global-multisite.
- *Leaner organizations* governmental organization are limited resources and must make the best use of them.

- *Corporate amnesia* when an employee leaves the organization, his/her experience and knowledge will be available in the organization knowledge base [25].

Organization knowledge base provides better feedback and expertise related to business processes, which can be recalled by the organization decision makers [10]. Using knowledge management platform to collect and gather information, documentaries, and feedback from stakeholders, users and customers. Knowledge can also be collected from other organizations who successfully implemented BPR, in order to benefit from their experience [21]. Transformational change is driven by the new technologies and from visions, policies and strategies, which are derived from the knowledge base.

Process re-engineering means transforming the process from the current state (which is the state that needs improvement) to the new state (which is the reengineered state) [2]. These two states are called in BPR terminology 'as is' and 'to be' situations [26]. The re-engineered state must provide a breakthrough regarding performance and radical change in the organization.

V. Validation

The proposed solution is validated through a public survey. The survey targeted subjects from three categories. The first category is computer sciences and information technology professionals. The second category is governmental employees. The third category is Saudi citizens. The numbers of participants from each category were 43, 36, 36 respectively. Each goal was evaluated using ten questions.

Table 2. Likert scale used to evaluate the questionnaire

Very High	High	Nominal	low	Very low
1	2	3	4	5

A. Cumulative Analysis of Goal 1

Table 3 shows that 40.90% of the total participants are not satisfied with the level of services they are getting from the Saudi public sector, and 34.20% of the total participants are facing a services delay due to bureaucracy or restrict regulations. Moreover, 39.1% of the total participants think that Saudi public agencies need to re-engineer the way they run their process. Furthermore, 43.5% agree on that implementing BPR in Saudi public agencies will improve the level of services and optimize the use of resources and 39.1% think that implementing BPR in Saudi public agencies will reduce the bureaucracy. However, only 25.2% believe that Saudi public agencies will establish the BPR efforts and consider re-engineering processes. This is expected that public organizations are less likely to initiate the BPR efforts. On the other hand, 70.5% agree on that Saudi public agencies have the budgetary power to implement BPR, and 36.5% think that Saudi decision makers acquire the knowledge about the importance of implementing BPR in public sector. Whereas, only 28.7% believe that Saudi public agencies will apply the BPR. On average 51.9% agree on the need to implement the BPR in the Saudi public agencies and that the Saudi public agencies are willing to establish the BPR. Fig. 2 illustrates a cumulative statistical analysis of goal 1, where each category is represented separately.

Table 3. Cumulative statistical analysis of goal 1

Q. No.	Very High	High	Nominal	low	Very low
1	17.40%	40.90%	28.70%	12.20%	0.90%
2	15.80%	34.20%	18.40%	26.30%	5.30%
3	39.10%	32.20%	14.80%	9.60%	4.30%
4	38.30%	43.50%	11.30%	5.20%	1.70%
5	24.30%	39.10%	20.90%	14.80%	0.90%
6	6.10%	19.10%	31.30%	31.30%	12.20%
7	4.30%	20.90%	20%	36.50%	18.30%
8	32.20%	38.30%	17.40%	11.30%	0.90%
9	13%	23.50%	27.80%	21.70%	13.90%
10	9.60%	19.10%	33.90%	30.40%	7%
Average	20.01%	31.08%	22.45%	19.93%	6.54%

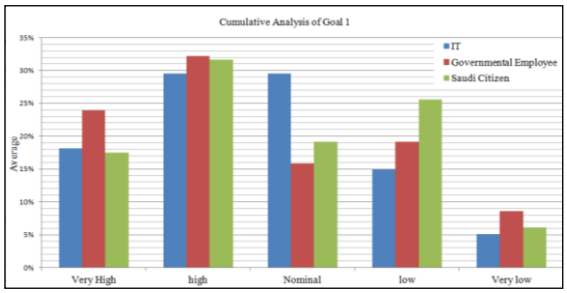

Fig.2. Cumulative statistical analysis of goal 1.

B. Cumulative Analysis of Goal 2

Table 4 shows that 64.1% of the participants are agreed that Saudi governmental agencies acquire the funds of BPR-relevant resources. Whereas, only 25.4% of the participants think that Saudi developers have the BPR needed skills.

However, 37.8% of the respondents are agreed that Saudi governmental agencies have the power to produce a post-BPR complementary set of skills, systems, and technologies and 29.8% of the participants believe that there is a risk of failure when BPR is introduced to the Saudi public sector. Furthermore, 42.5% believe that BPR implementation failure will be because of the lack of BPR resources and skills. However, 52.7% agree on that Saudi public agencies have the ability to successfully mitigate the effects of BPR implementation problems. 81.4% of the total participants agree on that the BPR implementation should be done step by step. In contrast with 41.2% who think that the BPR implementation should be introduced as a radical change in every public

sector. Moreover, 34.2% believe that BPR will be engaged in the public sector with sufficient depth and breadth. Moreover, 35.1% think that Saudi public agencies will have a successful introduction of BPR. 43.72% of the participants agree on that the Saudi public agencies acquire the funds of BPR-relevant resources and skills. Moreover, BPR will be engaged in the sufficient depth and breadth, and Saudi public agencies can produce a post-BPR complementary set of skills, systems, and technologies, and they will successfully mitigate the effects of BPR implementation problems. Fig. 3 illustrates a cumulative statistical analysis of goal 2, where each category is represented separately.

Table 4. Cumulative statistical analysis of goal 2

Q. No.	Very High	High	Nominal	low	Very low
1	21.10%	43%	23.70%	12.30%	0%
2	3.50%	21.90%	32.50%	34.20%	7.90%
3	5.30%	32.50%	21.90%	30.70%	9.60%
4	3.50%	19.30%	29.80%	28.10%	19.30%
5	5.30%	37.20%	20.40%	21.20%	15.90%
6	8.80%	43.90%	24.60%	21.10%	1.80%
7	26.50%	54.90%	13.30%	3.50%	1.80%
8	14.90%	26.30%	26.30%	8.80%	23.70%
9	7.90%	26.30%	29.80%	24.60%	11.40%
10	11.40%	23.70%	42.10%	20.20%	2.60%
Average	10.82%	32.90%	26.44%	20.47%	9.40%

C. Cumulative Analysis of Goal 3

Table 5 shows that 63.7% of the participants are supportive to the goal that Saudi public sector is willing to share its experience and knowledge. Moreover, 46.5% of the participants believe that knowledge management can be integrated with BPR in the Saudi public sector.

Table 5. Cumulative statistical analysis of goal 3

Q. No.	Very High	High	Nominal	low	Very low
1	17.30%	46.40%	19.10%	10%	7.30%
2	11.40%	35.10%	22.80%	18.40%	12.30%
3	13.30%	35.40%	31.90%	16.80%	2.70%
4	18.40%	43.90%	29.80%	6.10%	1.80%
5	15.80%	52.60%	24.60%	6.10%	0.90%
6	25.40%	52.60%	14%	7%	0.90%
7	26.30%	41.20%	22.80%	9.60%	0%
8	14%	38.60%	26.30%	16.70%	4.40%
9	21.20%	38.90%	17.70%	19.50%	2.70%
10	24.60%	32.50%	25.40%	12.30%	5.30%
Average	18.77%	41.72%	23.44%	12.25%	3.83%

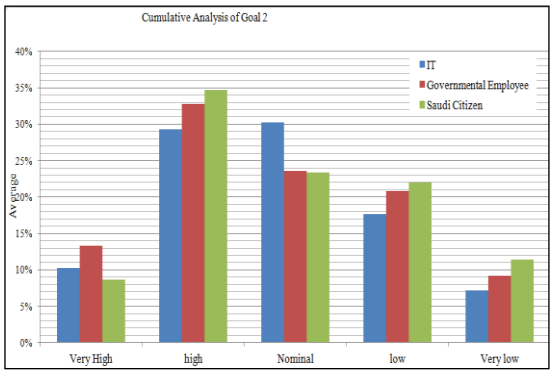

Fig.3. Cumulative statistical analysis of goal 2.

Furthermore, 62.3% of the professionals are agreed that integration of knowledge management with BPR in Saudi public sector will reduce the risk of failure. Moreover, 68.4% of the respondents are agreed that integration of knowledge management with BPR will enhance the way of BPR implementation in the Saudi public sector. Furthermore, 78% of the respondents are agreed that an organization knowledge base will provide better feedback and experience related to business processes. 67.5% of the participants believe that the re-engineered state must provide a breakthrough regarding performance and radical change in the organization. 52.6% of the respondents believe that knowledge management efforts are justified and it will result in a smoother implementation of BPR in Saudi public sector. 60.1% of the respondents are agreed on that transformational change in Saudi public sector is driven by the new technologies, visions, policies and strategies. 57.1% are optimistic about BPR implementation in Saudi Arabian public agencies. 60.49% of the respondents are agreed on that implementing BPR integrated with knowledge management in Saudi public sector. Fig. 4 illustrates a cumulative statistical analysis of goal 3, where each category is represented separately.

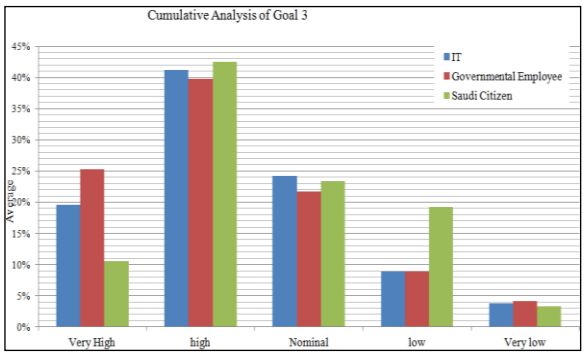

Fig.4. Cumulative statistical analysis of goal 3.

VI. Conclusion

Saudi Arabia's new vision requires a radical change in the public sector organizations. This research emphasise on the need of such a radical change. A framework is proposed to use knowledge base to implement the process

transformational change. The proposed solution shows that BPR can be used as a tool to achieve a successful transformation. The results of the study show that the proposed solution will minimize the rate of failure, provide customer-oriented services, and share expertise among the different public organizations. The findings of this study can be applied to other developing countries who share the same culture. The future direction is to validate the proposed solution using a case study.

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