

## THE EFFECT OF SHORTAGE OF CIVIL ENGINEERS ON THE QUALITY OF MUNICIPAL SERVICE DELIVERY

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**Abstract** – The aim of study was to assess and evaluate the effect of shortage of civil engineers on the quality of municipal service delivery in South African local municipalities. The design of study was cross-sectional, descriptive and evaluative. The study was conducted against the background of shortage of suitably qualified, adequately motivated and skilled civil engineers working in local municipalities. The degree of job satisfaction of respondents was assessed by using a composite index developed by Turkeyilmaz, Akman, Ozkan & Pastuszak (2011) for conducting a similar study. A combination of quantitative and qualitative methods of data collection and analyses were used in the study. As part of the quantitative aspect of study, data was collected from a stratified random sample of size 250 civil engineers working in various South African local municipalities. As part of the qualitative aspect of study, individual in-depth interviews were conducted with 37 civil engineers working in various local municipalities. Four focus group interviews were conducted as part of the study. Respondents who took part in the study came from municipalities in KwaZulu-Natal, North West, the Free State, Eastern Cape, Western Cape, Gauteng, Limpopo and Mpumalanga provinces. No responses were received from local municipalities in the Northern Cape Province. Four focus groups were used in the study in which focus groups were established in Gauteng (Pretoria), North West (Rustenburg), the Free State (Bloemfontein) and Mpumalanga (Middleburg) provinces in the period between April and November 2016. The survey was conducted by collecting data from respondents by using a structured, pretested and validated questionnaire of study. Quantitative data analyses were conducted by using methods such as frequency tables, cross-tab analyses (Pearson's chi-square tests of associations) and logit analysis. The results showed that 171 of the 250 respondents who took part in the study (68.40%) were satisfied with the job that they were performing in the various local municipalities, whereas the remaining 79 of the 250 respondents in the study (31.60%) were not satisfied with their jobs. Based on results obtained from cross-tab analyses at the 5% level of significance, the degree of job satisfaction of civil engineers at the workplace was significantly and adversely affected by too much workload, poor working conditions, lack of budget for construction projects, low salary and remuneration, lack of training opportunities, lack of cooperation and appreciation, too much bureaucracy and red tape, short duration of service, and poor relationship with supervisors, in a decreasing order of strength. Results obtained from logit analysis showed that the degree of job satisfaction of civil engineers at the workplace was significantly and adversely affected by 3 factors. These 3 factors were too much workload, poor working conditions, and lack of budget for construction projects in a decreasing order of strength. Results obtained from individual and focus group in-depth interviews were fairly similar to those obtained from logit analysis.

**Keywords:** Local municipalities, Civil engineers, Municipal service delivery, Logit analysis.

### INTRODUCTION TO STUDY

Kearney (2018) and Warner (2011) have shown that efficiency in the quality of municipal service delivery depends upon the availability of specialised skills in civil engineering. In developing municipalities, the degree to which municipal service delivery can be provided depends upon the availability of specialised and technical skills (Bel & Gradus, 2018). Municipal service delivery has always generated significant public interest due to the frequent service delivery protests occurring throughout the country as well as risks generated by infrastructure breakdowns to public health, environmental integrity and municipal financial sustainability. According to the Department of Cooperative Governance and Traditional Affairs (CoGTA 2012:4) and Municipal IQ Hotspot Monitor (2012), the primary causes of service delivery protests throughout the country remains the delivery of basic municipal services such as running water, electricity and toilets especially in informal settlements. According to CoGTA (2012: 4) the above is exacerbated by high unemployment and high levels of poverty, poor and failing infrastructure and the lack of housing. Ntuli (2010) has argued that protests in local municipalities were caused by poor quality of

municipal service delivery and the acute shortage of technical and artisan skills. The strategic link between service delivery and the civil engineering profession has long been established. Pillay and Watermeyer (2012: 46) have pointed out that a major portion of the work undertaken by civil engineers involves public infrastructure. According to Pillay and Watermeyer (2012), the civil engineering discipline currently accounts for just less than half the number of professional engineers and technologists registered with the Engineering Council of South Africa (ECSA) and is involved in the following:

- The detailed planning, design, construction and optimisation or condition assessment of infrastructure;
- The development of short-, medium- and long-term infrastructure plans at both a portfolio and project level, and the administration of works contracts for the acquisition, refurbishment, rehabilitation and maintenance of infrastructure;
- The strategic planning and management of the operation and maintenance of infrastructure; and
- Specific duties relating to health, safety and environmental aspects of infrastructure as provided for in legislation.

Civil engineering is part of the regulated professions within the built environment professions regulated by statute in South Africa. There are other regulated built environment professions such as construction managers, construction project managers, engineers, architects, quantity surveyors, property valuers and landscape architecture which are regulated by their own statutory professional bodies and also fall within the regulatory domain of the Council for the Built Environment (CBE). The Council for the Built Environment (CBE) is the overall statutory body established by legislation in terms of the CBE Act 43 of 2000 which mandates the CBE to oversee and coordinate the activities of its six professional councils (including the engineering profession) and fulfils the following regulatory functions.

The South African civil engineering profession is regulated through the Engineering Professions Act 46 of 2000 which enables the establishment of the Engineering Council of South Africa (ECSA), a statutory professional registrations body which has been statutorily mandated to set professional standards and enforce these standards for the benefit of the civil engineering practitioners, the country and the profession. Within the context of this study, civil engineering local government built environment practitioners refers to the officials contracted / employed by a municipality for infrastructure management, service delivery and maintenance in the water, electricity, solid waste, roads and sanitation sectors.

### BACKGROUND OF STUDY

Studies conducted by Bel and Warner (2015) and Hodge (2018) have shown that local municipalities must have the capacity to attract and retain the services of qualified civil engineers as a means of ensuring satisfactory service delivery. The study was conducted in the context of relative scarcity of requisitely qualified and professionally registered civil engineering staff in the South African local government sector and paucity in empirical data relating to professionalization in the local government built environment professions. There is paucity in empirical data on the reasons behind the turnover of local government built environment practitioners out of the sector and why some operate outside the regulated provisions of their professions. The scarcity of requisite qualified and experienced municipal engineers is indirectly linked with the challenges relating to poor infrastructure asset management, tendering irregularities, collapsing infrastructure and its related public health and safety problems as well as service delivery community protests that infrastructure collapses typically elicits.

In order to be able to address the challenge of poor infrastructure institutional capacity besetting municipal infrastructure departments and utilities, it is important that an in-depth study that focuses on the root cause analysis of the problem be implemented. The study also aims to develop interventional measures to promote professionalization of municipal civil engineering practitioners and the development of civil engineering institutional management capacity by the local government sector in general. In assessing the causes and barriers affecting civil engineering built environment professionals and poor institutional management capacity, the study will seek to test the assumptions behind the structuration and institutional theories especially the institutional entrepreneurship role of local government built environment officials as public entrepreneurs. The study aims to test the relevance and veracity of the institutional and structuration theoretical underpinnings (Paauwe & Boselie

2003) which avert that “organisational practices are either a direct reflection of, or response to, rules and structures built into their larger environment”.

The South African Local Government Association (SALGA) Skills Profiling Survey (2006:1) found that only 4% of Councillors have a university degree, 16% a diploma and that 30% of municipal Councillors have a certificate qualification. The survey also found that at least 50% of municipal Councillors have only grade 12 qualifications or below. The study also found that 67% of municipal Councillors are in office for the first term, with 25% of Councillors in office for the second term and that only 8% of municipal Councillors are in office for a third term or longer. This study indicated that there is a capacity disjuncture in terms of experience and educational levels of Councillors and that this is caused by loss of institutional management skills due to the labour turnover of Councillors as a result of re-elections and redeployments of Councillors amongst others implying that after every 5 yearly election of local government Councillors, the new cohort of Councillors need to be trained and developed for local government leadership and management. With regards to infrastructure related management skills or built environment skills, the National Planning Commission (NPC) published its Diagnostic Report (2011: 8) which highlighted how amongst others, poor municipal service delivery, technical skills insufficiency and poor operations and maintenance of municipal infrastructure constrain the capacity of the South African economy to grow.

The National Development Plan (NDP) focuses on local government to make it a career of choice by emphasising skills and experience in the recruitment of senior managers to ensure that local government is equipped with the necessary specialist and technical skills required for service delivery (Municipal Demarcation Board, 2012: 1). In its sector analysis study, the Municipal Demarcation Board (MDB) capacity study (2010: 32 - 34) found that the scarcity of relevant infrastructure management skills and experience has led to municipal vacancy rates as high as 40% in local municipalities. The Sector Skills Plan (2005 -2010) of the Local Government Sector Education and Training Authority (LGSETA) on the other hand estimated municipal vacancy to be as high as up to 90% in municipal infrastructure departments affecting built environment-related professions and occupations such as artisans, plant operators, civil engineers, town planners and water/ wastewater process controllers.

## OBJECTIVES OF STUDY

The objective of this study is to identify and quantify factors that are known to adversely affect the practice of civil engineering in the South African local government sector (Bolivar, 2017). The study aims to identify key barriers constraining the professionalization of the civil engineering professionals in South African local municipalities (Meyer & Rowan, 1977; Paauwe & Boselie, 2003:59).

The study has the following three specific objectives:

- To investigate the barriers preventing the attainment and maintenance of professionalization by municipal civil engineering practitioners;
- To develop interventional measures to promote professionalization of municipal civil engineering practitioners in the local government sector; and
- To develop interventional measures to ensure the development of institutional capacity by municipalities and the local government sector in general.

The objective of this chapter was to chart the research topic as well as explore the interconnectivity between municipal service delivery, municipal institutional and management capacity and the civil engineering profession.

From the above-mentioned, it becomes clear that municipal service delivery is strategically linked to the civil engineering profession and is critical due to the risks generated by infrastructure breakdowns to public health, and safety as well as environmental integrity. From the above-mentioned, it is clear that the institutional and management capacity of municipalities for service delivery is severely constrained by the shortages in the supply of civil engineering skills within the local government sector.

From the above-mentioned it becomes clear that there has been over the years various support programmes implemented by national and provincial government, foreign development agencies and the private sector aimed at supporting municipalities. These include support interventions in municipal governance, administration; infrastructure project planning, service delivery, gap filling and regulation. Whilst such capacity interventions have been implemented, the impact thereof appears quite negligible. From the above-mentioned it also becomes clear that the most critical cause of municipal service delivery protests by disaffected communities is the delivery of basic municipal services such as running water, electricity and toilets and is exacerbated by the prevalent high unemployment and poverty levels.

## METHODS AND MATERIALS OF STUDY

A combination of quantitative and qualitative methods of data collection and analyses were used in the study. Fresh data was collected from respondents of study by using quantitative and qualitative methods. In addition to this, historical data sets were analysed as part of the study. As part of the quantitative aspect of study, frequency tables, bar charts, pie charts and descriptive statistical tests, binary logistic regression analysis (Hosmer and Lemeshow, 2013) and factor analysis (Field, 2010) were used for data analyses. According to Cooper and Schindler (2014), cross-tab analyses are helpful for screening a large number of variables to a manageable size. As part of the qualitative aspect of study, data was collected from 37 individual respondents by using a tape recorder. Additional 4 focus group interviews were conducted as part of the study. The interviews were transcribed later. Responses were tallied and coded. Thematic and text analyses as well as triangulation were used for performing qualitative data analyses.

## RESULTS OF DATA ANALYSES

A total sample of two hundred and fifty (250) Respondents from eighteen (x18) low-capacity local and district municipalities (excluding high capacity metropolitan municipalities) were selected through stratified random sampling targeting Infrastructure Directors, Project Management Unit managers as well as junior officials employed as engineers irrespective of experience; professional registration status (Professional Engineer, Technician, Technologist, Candidate or unregistered); level of management experience and seniority and irrespective of the civil engineering sub-functional area of work (*water, sanitation, roads and storm water, solid waste, housing, asset management, designs, energy*). Respondents who took part in the study came from a total of 12 municipalities in KwaZulu-Natal, North West, Free State, Eastern Cape, Western Cape, Gauteng, Limpopo and Mpumalanga provinces. No Respondent responses were received from Respondents based in municipalities in the Northern Cape Province. Four focus group discussions were held with municipal engineering Respondents in Gauteng (Pretoria), North West (Rustenburg), Free State (Bloemfontein) and Mpumalanga (Middleburg) provinces in the period from 01 April to 30 November 2016. Blacks accounted for 62.8% of respondents, whereas 19% of respondents were white, 10.25% of respondents were coloured, and 7.69% of respondents were Indian.

**Table 1: Highest level of education of respondents (n=250)**

Highest level of education	Percentage
Matric level only	1.28%
Matric + certificate	14.10%
NQF level 3 to NQF Level 6	17.94%
National Diploma	32.00%
Bachelor's degree	24.35%
Master's degree or more	10.25%

The percentage of respondents with Bachelor's degree was equal to 24.35%. The percentage of respondents with Master's degrees or more was equal to 10.25%. The majority of respondents had national diplomas (32.0%). The percentage of junior employees was equal to 6.41%. The percentage of skilled junior employees was equal to

24.36%. The percentage of employees who were junior managers was equal to 42.3%. The percentage of employees who were senior managers was equal to 26.9%.

**Table 2: Salaries of respondents in Rand (n=250)**

Salary in Rand	Percentage
R15, 000 to R25, 000	6.41%
R25, 001 to R35, 000	15.35%
R36, 001 to R45, 000	34.60%
R45, 001 or above	20.50%
Others	23.0%

Out of the total questionnaire responses received from municipal engineering Respondents (n = 78), a minority of Respondents constituting 37% of Respondents indicated that they are indeed professionally registered with the Engineering Council of South Africa (ECSA) either as Candidates (15.4%), Professional Technicians (8.9%), Professional Technologists (6.41%) as well as registered with Other Councils (1.28%). The majority of respondents were either not professionally registered with ECSA (34.6%) or were previously registered but currently de-registered (28.2%) due to several reasons primarily the non-payment of professional registration fees. Of those Respondents who were professionally registered, the vast majority of Respondents were registered Candidates.

**Table 3: Registration status of respondents (n=250)**

Status	Percentage
Not registered	34.6%
De-registered	28.2%
Registered candidate with ECSA	15.4%
Registered candidate with other councils	1.28%
Registered technician	8.9%
Registered technologist	6.41%
Registered engineer	5.12%

Out of the Focus Group interviews held with Respondents (n = 37), a smaller percentage of Respondents (32%) indicated that they are indeed professionally registered with the Engineering Council of South Africa (ECSA) either as Candidates (8.10%), Professional Technicians (8.10%) and were also members of a Voluntary Association (8.10%). An overwhelming majority of Respondents are not registered (32%) or were initially registered but subsequently deregistered (27%). During the Focus Group interview discussions with Respondents, it became clear that a significant number of Respondents who initially indicated that they are indeed professionally registered on the questionnaires were in fact alluding to their membership of Voluntary Associations most notably the Institute of Municipal Engineers of SA (IMESA) as well as the South African Institute of Civil Engineering (SAICE) and that some of the Respondents were not professionally registered with ECSA as the regulatory professional body regulating the civil engineering profession.

Out of the total questionnaire responses received from municipal engineering Respondents (n = 78), a significant number of Respondents (n =30) constituting 38% of Respondents confirmed that they received their Experiential Learning or initial workplace exposure in the private sector. A further 19.2% of Respondents (n = 15) confirmed that they received their Experiential Learning at a public sector state entity. 15.3% of Respondents indicated that they received their Experiential Learning at the same municipality whilst a further 12% of Respondents confirmed that their received their initial workplace exposure with another municipality. The vast majority of Respondents about 62% of Respondents confirm that they have received their Experiential Learning exposure within the public sector either with a municipality, national/ provincial government or a state entity.



When municipal engineering Respondents were asked about their duration of employment with their current municipality, the majority of Respondents (82%) out of the total questionnaire responses received (n = 78), indicated that they have between 2 - 6 years duration of employment with their current municipality. A significant number of Respondents (n = 22) constituting 28.2% of the total Respondents indicated that they have worked for the same municipality for a period of 3 years. This was followed by Respondents with 5 years (23%), 6 years (15.38%) and 2 years work experience with the same municipality. Only a minority of Respondents constituting (2.56%) had the longest duration of employment with the same municipality at 13 years in total whilst 15.38% of Respondents had the shortest duration of employment with their current municipality at two (2) years. During subsequent focus group discussions, when municipal engineering Respondents were asked about the duration of their total work experience prior to employment by the municipality, the majority of Respondents out of the total questionnaire responses received (n = 39), indicated that they have between 5 - 10 years practical working experience. The Respondents with the highest work experience has worked for more than 11 years in total whilst the Respondents with the lowest working experience have worked for the municipality for less than 2 years.

When municipal Respondents were asked to describe their current responsibilities, municipal Respondents cited project management responsibilities, project monitoring of infrastructure management projects, providing support to Accounting Officer on engineering projects, management of roads & stormwater, water/ wastewater, sanitation, waste, electrical and town planning services, providing strategic and technical leadership to infrastructure department as well as managing budget and performance of department as part of their responsibilities.

The Pearson chi-square test of association (Hair, Black, Babin and Anderson, 2010) was used for performing a preliminary screening of influential factors that were significantly associated with job satisfaction by 250 respondents who took part in the study. The degree of job satisfaction of respondents was measured by using a composite index developed by Turkyilmaz, Akman, Ozkan & Pastuszak (2011) for conducting a similar study. The results showed that 171 of the 250 respondents who took part in the study (68.40%) were satisfied with the job that they were performing in the various local municipalities, whereas the remaining 79 of the 250 respondents in the study (31.60%) were not satisfied with their jobs. Pearson’s chi-square tests of association were performed between values of variable Y and each of the factors that are known to affect job satisfaction in South African local municipalities. The results showed that job satisfaction was significantly associated with 5 factors at the 5% level of significance. At the 5% level of significance, significant two-way associations are characterized by large observed chi-square values and P-values that are smaller than 0.05. Table 4 shows 9 significant two-by-two associations obtained from cross-tab analyses at the 5% level of significance.

**Table 4: Significant associations obtained from cross-tab analyses (n=250)**

Factors adversely affecting job satisfaction	Observed value	chi-square	P-value
Too much workload	12.084		0.000***
Poor working conditions	10.1257		0.000***
Lack of budget for construction projects	9.8224		0.000***
Low salary and remuneration	8.1077		0.000***

Lack of training opportunities	7.3257	0.000***
Lack of cooperation and appreciation	6.4114	0.000***
Too much bureaucracy and red tape	5.9454	0.003**
Short duration of service	4.2116	0.004**
Poor relationship with supervisors	3.2039	0.007**

**Legend:** Significance at \* P<0.05; \*\* P<0.01; \*\*\* P<0.001 levels of significance

Based on results obtained from cross-tab analyses, at the 5% level of significance, it can be concluded that the degree of job satisfaction of civil engineers at the workplace is significantly and adversely affected by the following 9 factors in a decreasing order of strength: Too much workload, poor working conditions, lack of budget for construction projects, low salary and remuneration, lack of training opportunities, lack of cooperation and appreciation, too much bureaucracy and red tape, short duration of service, and poor relationship with supervisors.

The 9 predictor variables shown in Table 4 were used for performing subsequent multivariate analysis by using binary logistic regression analysis. Results from binary logistic regression analysis are theoretically more reliable than results from Pearson’s chi-square tests of association (Hosmer & Lemeshow, 2013). This is because the measure of effect in binary logistic regression is the odds ratio, and not two-by-two significant associations. Binary logistic regression of analysis was performed by performing the regression of variable Y (viability) on the 8 predictor variables of study that were identified by performing cross-tab analyses. At the 5% level of significance, influential predictors of motivation have odds ratios that are significantly different from 1, P-values that are smaller than 0.05, and 95% confidence intervals of odds ratios that do not contain 1.

**Table 5: Odds Ratios (OR) estimated from binary logistic regression analysis**

Variable	P-value	OR and 95% Confidence Intervals of Odds Ratio
Too much workload	0.000	4.24 (2.28, 7.66)
Poor working conditions	0.000	2.68 (1.89, 5.89)
Lack of budget for construction projects	0.001	2.57 (1.74, 5.56)

At the 5% level of significance, 3 of the 9 variables used for binary logistic regression analysis were highly influential predictors of job satisfaction. These 3 predictor variables of study were: too much workload, poor working conditions, and lack of budget for construction projects, in a decreasing order of strength.

### Interpretation of odds ratios

The odds ratio of the variable “too much workload” is equal to 4.24. This indicates that an employee who experiences too much workload is 4.24 times as likely to be dissatisfied at work in comparison with another employee who does not experience too much workload. The odds ratio of the variable “poor working conditions” is equal to 2.68. This indicates that an employee who experiences poor working conditions is 2.68 times as likely to be dissatisfied at work in comparison with another employee who does not experience poor working conditions. The odds ratio of the variable “lack of budget for construction projects” is equal to 2.57. This indicates that an employee who experiences lack of budget for construction projects is 2.57 times as likely to be dissatisfied at work in comparison with another employee who does not experience lack of budget for construction projects.

The percentage of overall correct classification for the fitted binary logistic regression model was equal to 80.44%. This figure is above 75%, and shows that the fitted binary logistic regression model is highly reliable. The P-value obtained from the Hosmer-Lemeshow goodness-of-fit test is equal to  $0.1491 > 0.05$ . This shows that there is no reason to doubt the theoretical reliability of the fitted logistic regression model.

### DISCUSSION OF RESULTS

Steiner, Kaiser, Tapscott and Navaro (2018) have shown that the quality of municipal service delivery is dependent upon the availability of specialised vocational and technical skills. Studies conducted by Edoho (2015), Turkyilmaz, Akman, Ozkan & Pastuszak (2011) and Yau-De, Yang & Wang (2012) have shown that local municipalities must invest in tailor-made and skilled based training opportunities by collaborating with academic and research institutions as a means of improving their capacity to deliver quality municipal services. The results showed that 171 of the 250 respondents who took part in the study (68.40%) were satisfied with the job that they were performing in the various local municipalities, whereas the remaining 79 of the 250 respondents in the study (31.60%) were not satisfied with their jobs. Based on results obtained from cross-tab analyses at the 5% level of significance, the degree of job satisfaction of civil engineers at the workplace was significantly and adversely affected by too much workload, poor working conditions, lack of budget for construction projects, low salary and remuneration, lack of training opportunities, lack of cooperation and appreciation, too much bureaucracy and red tape, short duration of service, and poor relationship with supervisors, in a decreasing order of strength. Results obtained from binary logistic regression analysis showed that the degree of job satisfaction of civil engineers at the workplace was significantly and adversely affected by 3 factors. These 3 factors were too much workload, poor working conditions, and lack of budget for construction projects in a decreasing order of strength. Results obtained from individual and focus group in-depth interviews led to similar findings.

The majority of Respondents (62%) received their initial workplace exposure within the public sector either with a municipality, national/ provincial government or a state entity. About 38% of Respondents received their initial workplace exposure in the private sector. The majority of Respondents (82%) have worked between 2 - 6 years with their current municipality. 28.2% of Respondents have worked for the same municipality for a period of 3 years followed by 23% of Respondents with 5 years of work experience and 15.38% Respondents with 6 years' work experience with the same municipality. Only 2.56% of Respondents had the longest experience at 13 years with the same municipality whilst a further 15.38% of Respondents had the shortest work experience with their current municipality at only two (2) years of work experience.

The professionalization of municipal civil engineers is constrained by the following factors:

- 1) Lack of interest in professional registration due to a perceived lack of benefits to the registered professional
- 2) Perceived lack of “power” by ECSA over unregistered engineers and municipalities employing unregistered / unregistrable persons
- 3) Little or no financial subsidy assistance provided by municipalities for CPD and annual membership fees
- 4) Appointments of Underqualified, Inexperienced and Unregistrable “Deployees”
- 5) Compromised Supply Chain Management (SCM) Practices



- 6) The Removal of PMU and Infrastructure Asset Management Functions and Budgets from the Infrastructure / Technical Director's Duties
- 7) Political Appointments of Underqualified and Inexperienced Consulting Engineers and Contractors
- 8) Poor Support from other municipal functions such as Supply Chain Management (SCM) and HRM
- 9) A Hostile Politicised Work Environment with Lack of Support
- 10) Low Salaries on offer
- 11) High costs of family relocation to rural workplaces
- 12) Poor Career growth
- 13) Perceived Unfair Municipal Recruitment and Promotion Practices
- 14) Lack of Study opportunities
- 15) Lack of Functional Design offices
- 16) High Workloads;
- 17) Unwillingness by Registered persons and Employer Municipalities to undertake Statutory Compliance
- 18) Underfunding & Lack of budgets
- 19) Professional Integrity and Work Ethics not protected and respected by Senior Municipal Management and Councillors (the Executive)
- 20) Career Frustration & Lack of Exposure (only project management work)

The majority of municipal engineering Respondents have cited lack of interest in professional registration due to a perceived lack of benefits deriving from professional registration for the both municipal engineers as well as the employer municipality as well as hostile work environment as the key underlying reasons for poor professionalization.

Other contributory factors is a lack of understanding of the profession; lack of political support; poor support from other municipal functions such as Supply Chain Management (SCM) and HRM; low salaries on offer; high costs of family relocation to rural workplaces; poor career growth; perceived unfair recruitment and promotions; lack of study opportunities; lack of functional design offices; high workloads; unwillingness on the side of the registered persons and employer municipalities to undertake statutory compliance with the Engineering Professions Act of 2000; a lack of resources as well as little or no financial subsidy assistance provided by municipalities to its registered engineering professionals to comply with Continuing Professional Development (CPD) and the payment of annual membership fees.

## FRAMEWORK FOR IMPROVED SERVICE DELIVERY

Voluntary associations representing individual membership-based municipal civil engineers such as Institute of Municipal Engineers (IMESA) and the South African Institution of Civil Engineering (SAICE) whose members are directly affected, need to actively engage Contractors such as the South African Federation of Civil Engineering Contractors (SAFCEC) and Consultants in the form of the Consulting Engineers of South Africa (CESA) because Contractors and Consultants also play a direct contributory role in the loss of institutional capacity by municipal infrastructure departments since most Consultants and Contractors derive their income from the sector and have directly or indirectly caused institutional weaknesses and dependencies by municipalities to their services and expertise. The professionalization process will entail a series of negotiations with other agents or players in the sector, careful balancing of interests and if required, the direct exercise of institutional, statutory and structural power that civil engineers wield individually in their municipalities and collectively within the sector by compelling their own subordinates to register professionally with the statutory body. Based on the above-mentioned, it is clear that unless the Engineering Council of South Africa (ECSA) and other built environment professional Councils strengthen their regulatory oversight role over municipal engineers whether registered or unregistered, that the quality service delivery interests of communities and the professionalization of the local government civil engineering profession will forever remain a neglected key consideration resulting in declining quality of municipal service delivery and further agitations by disgruntled communities.

Figure 1 shows a suitable framework that could be used by South African local municipalities for attracting, motivating, retaining and empowering civil engineers. The framework consists of four sequential phases. Phase 1 entails a needs assessment survey. Phase 2 entails the task of designing a suitable training plan that could be used for fulfilling the training needs and requirements of civil engineers. Phase 3 entails implementation of the plan.

Phase 4 entails evaluation of the plan. The framework is adapted from the framework developed by Barg, Ruparathna, Mendis and Hewage (2014) and could be used for motivating, retaining and empowering construction workers and civil engineers working in the public sector and local municipalities.

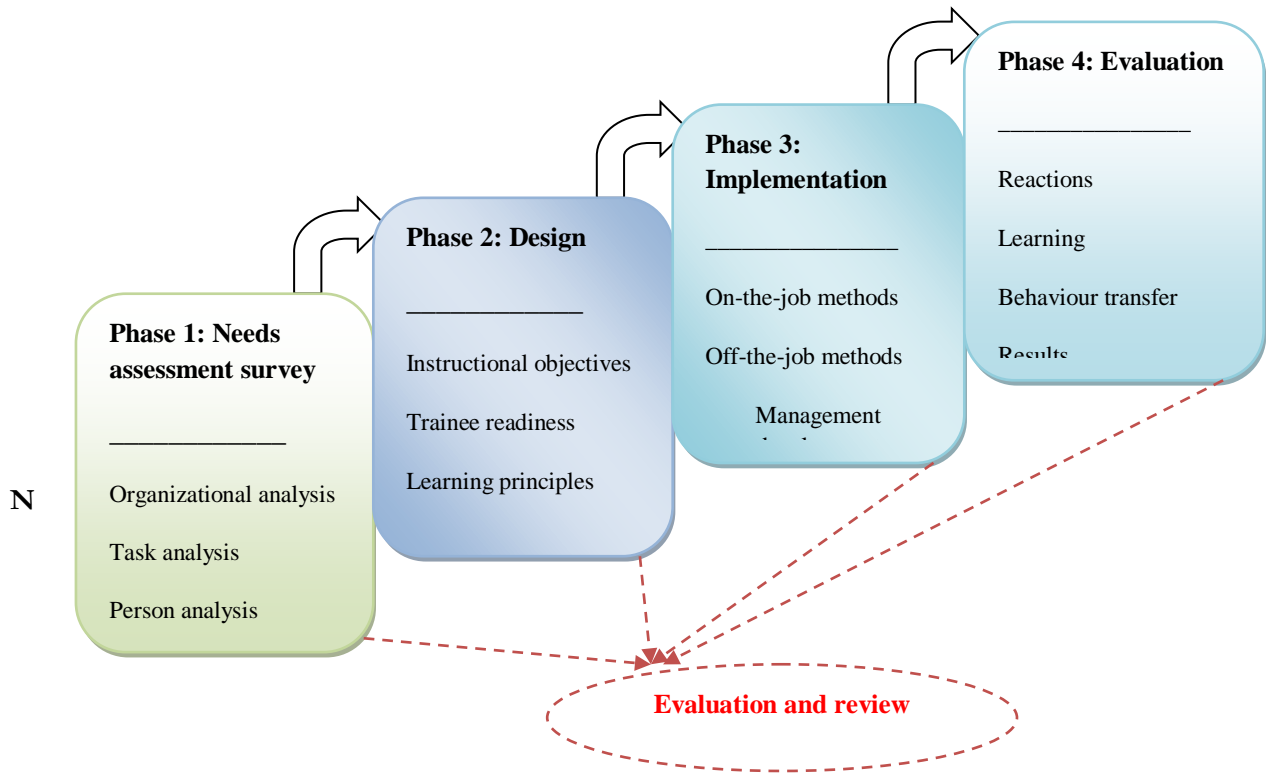


Figure 1: Framework for South African local municipalities

The framework shown in Figure 1 proposes the establishment of the following bodies:

- A team comprising monitoring and evaluation experts that specifically focuses on training and development
- The team takes a leading role in needs assessment, setting standards, initiating and ensuring accreditation and quality assurance at national, institutional and departmental levels. Specific criteria for monitoring and evaluation and performance indicators with regards to training and development must be drawn.
- Every phase must comprise of liaison officers who ensure proper and effective consultation and communication with officers in the other phases.

It is strategically beneficial for South African local municipalities to provide civil engineers with career growth paths and development programmes. Tailor-made and skills based training opportunities and attractive remuneration packages should be provided to civil engineers as a means of attracting productive and highly motivated civil engineers into local municipalities. Training programmes must be provided to civil engineers as an incentive. Such programmes of training must be aligned with the operational and business needs and requirements of local municipalities. Local municipalities must forge strategic partnerships and collaborations with key stakeholders such as research and academic institutions with a view to acquire suitable training and development programmes. A comprehensive monitoring and evaluation programme is vital for monitoring the progress made in this regard.

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