

# **Assessment on the role of planning and implementation of road, water and electric infrastructure on the growth of micro and small enterprises: the case of Hawelti and Adihaki sub cities, Mekelle, Ethiopia**

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## **Abstract**

*The study is conducted to identify the role of integrated physical infrastructure planning and implementation in relation to benefit of MSE's. For the study 161 MSE's are selected on probability systematic random sampling method whereas 38 experts and 7 officials are selected on purposive non probability method. The study reveals that the micro and small enterprises face various challenges against their manufacturing activities, productivity and growth. It highlights that due to non integration of infrastructure in planning and implementation, the MSE's are negatively influenced. There is no integration among utility sectors during the planning and implementation and absence of coordination office from top to bottom. To fill the gap it is recommended that in the federal as well as city administration level, policy makers and researchers should create the legal frameworks, rules, regulations and directives to support implementation and create enforcement for the sectors and to follow the rules and regulations for the working urban structure plan.*

*Key Words: MSE, infrastructure, integrated, planning, implementation,*

## **I. Introduction**

The world's urban population is expected to surpass six billion by 2045. Much of the expected urban growth will take place in countries of the developing regions, particularly Africa (UN, 2014) resulting in increased in quality and quantity of infrastructures. The developed nations are expected either to maintain the existing mega cities or reduce in size. The tremendous fast increased urban dwellers in most cities of the developing countries are faced with various problems in respect to high incidences of poverty and unemployment, poorly developed infrastructure, inadequate public services, worsening shelter, deficits and accelerated environmental deterioration tend to be significant. The expansion of infrastructure is not only among the problems observed in urban areas but renewing and upgrading the existing infrastructure is also the major drawback in majority of the cities. Infrastructure is directly linked with the productivity and performance of urban economies and macroeconomic development. Urban infrastructure is among the variable to qualify cities to invest in. However,

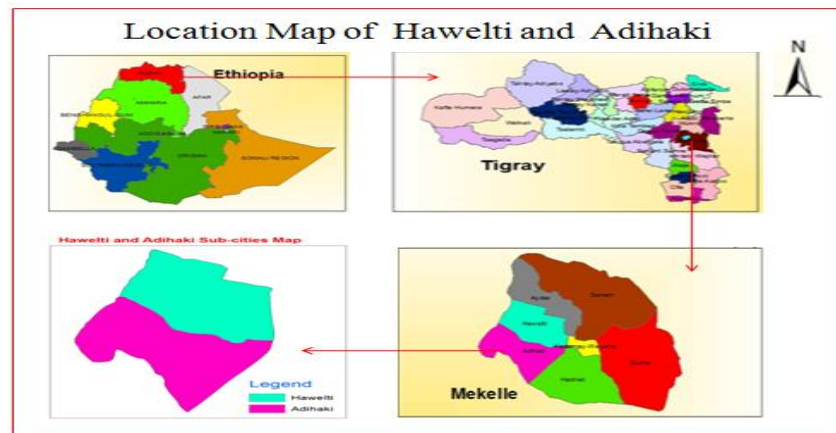
the development and improvement of infrastructure and services require appropriate investment decisions and effective utilization of scarce municipal resources.

However, urban infrastructure in the developing world is often subjected to haphazard planning, disjointed implementation and poor post installation management. Usually, inadequate attention is given to the interdependencies between infrastructure systems, the urban functions to be served and to the sustainability of the facilities. The outcome is poor facility functions, early deterioration and unwanted settlement development, implying the wasteful use of scarce resources. The contemporary urban society needs an efficient system of road, electric power, water supply and telecommunication services and facilities. However; the provision of such infrastructures is highly constrained by institutional planning, technological and policy factors. Infrastructure is not delivered as a complete functioning system and focused huge infrastructure backlogs but future needs planning are not integrated into long-term economic development plans.

In Mekelle, the agency still does not organize and integration level of all sectors are at lower level. Because of this, the physical structure which is constructed by one sector is destroyed by the other sector. This leads to poor provision of infrastructure and asks additional cost for the newly constructed infrastructure which is destroyed by another sector. And also to get the services it asks additional cost and creates obstacle for growth and their transforming to manufacturing industries.

## **II. Study Area**

Mekelle is found in the National Regional state of Tigray, which is found in the northern part of Ethiopia. It is the capital city of the national regional state of Tigray. It is located at a distance of about 780 km north of the capital Addis Ababa (Structural plan of the city, 2016). Geographically, the city is located at 13°29'N and 39°28'E. It was founded around 13th – 14th century. But, the city got its prominence during the reign of Yohannes IV, when he chose Mekelle as his seat of administration in the 19th century. Since then the city has acted as an administrative and trade center. And currently, Mekelle serves as an economic, administrative and political seat of Tigray National Regional State. It also shelters significant number of educational institutions and large manufacturing centers, which are the engines behind the city's economy. Mekelle's development can be characterized as sporadic and discontinuous. The city has spread outwards north, northwest, west and south from the foot of EndaYesus escarpment, which however constrained the development of the city towards east.



### III. DATA SOURCE AND RESEARCH METHODOLOGY

To achieve the objectives of the study, a descriptive type of research is used. Primary data was collected from selected MSE's members, head of Mekelle city administration office, directorates and experts from the city and two sub-cities. The study also deployed observation of installations of utility services, damaged infrastructures by another sector to construct its service, day to day activities of the MSE's and the alternative solutions to fill the gap of services in the two sub-cities.

Both open ended and closed ended questionnaires were deployed to collect primary data from the MSE's members and experts of the office which are involved in the implementation of integrated infrastructure and MSE of the city and the two sub-cities. As the two sub-cities include predetermined land for the dairy, fattening and poultry production and the sample of MSE's were randomly selected from the frame list in the two sub-cities. Systematic random sampling is employed to select sample members of MSE's from the sample frame list of the two sub-cities of Mekelle. Because the number of the target population in the two sub-cities is not equal, the study incorporated proportional sampling procedure size from the selected sub-cities.

A sample of 468 (272 from Hawelti and 196 from Adihaki) were selected using systematic sampling. But before deciding the sample, the sample size is fixed using the sample size formula given by Kothari (1990).

According to Kothari, the sample size was mathematically calculated as given below.

$$n = \frac{z^2 pq}{d^2} \dots\dots\dots, \text{ if } N \geq 10000$$

$$\text{if } N = \frac{n}{1+n} \dots\dots\dots, \text{ if } N < 10000$$

where; N is the target population,

n is the desired sample size,

p is the estimated characteristics of population,

$$q = 1 - p,$$

z is the standard normal variance at the required confident level (z- statistics),

and d is the level of statistical significance (margin of error).

In this study, Z = 1.88 (94%)

Therefore,  $n = (1.88)^2 \times (0.5)(0.5) / (0.06 \times 0.06) = 245$

Since,  $N < 10000$ ,

$N = n / (1 + n) / N$

$N = 245 / (1 + 245 / 468)$

$N = 160.81$

$N = 161$

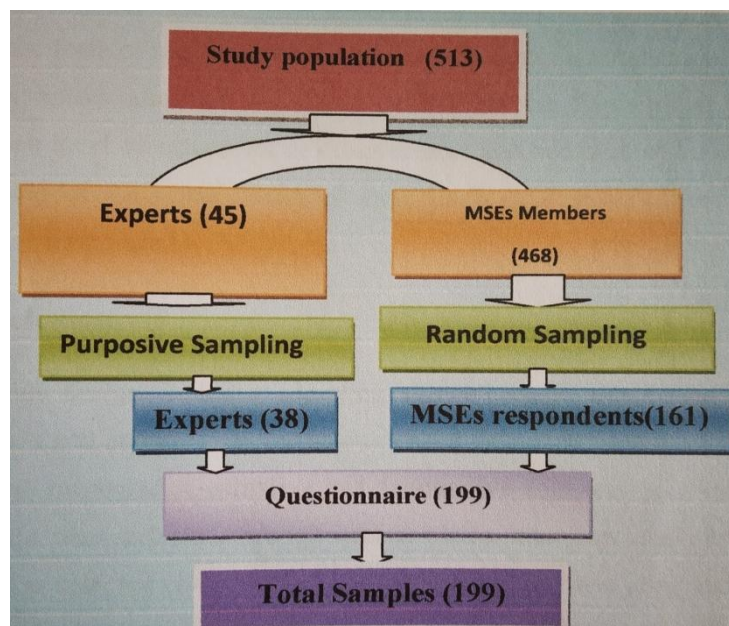
Based on the sample size result and the total population using the formula  $N/n$ , the sample respondents were systematically included as follows:

Where,  $N$  = Population size

$n$  = Sample size

$(N/n)^{th} = (468/161)^{th} = 3^{rd}$  (sample interval)

Figure 1: Sampling procedure



#### IV. Challenges of MSE's and integrated infrastructure provisions

Water, road and electricity are important factors of production. Majority of the manufacturing sector under the study area needs more water and electricity as basic inputs. As can be seen in table 1, there is a strong negative effects due to lack of all weathered roads (36.6%), water supply (83.2%) and electric provisions (67.1%). As was observed during a field trip to a dairy and poultry farm in the study area of Adihaki and Hawelti that the block was constructed only four years ago and have about 201 member beneficiaries investing in dairy and farming without electric and water supply. The water is supplied by cart trucks. Beneficiaries face a lot of challenges to get the services done in time, have poor quality and are too expensive. Due to lack of

integrated infrastructure provisions, MSE's face many challenges to continue their investment and most of them could hardly cover their monthly expenditures.

**Table 1: Challenges of MSE's respondents due to integrated infrastructure provisions**

Level of effect due to all weathered roads, road, water and electric power provisions						
	All weathered road		Water supply		Electric power line	
High	59	36.6	134	83.2	108	67.1
Moderate	16	9.9	12	7.5	15	9.3
Low	36	22.3	10	6.2	10	6.2
None	50	31.1	5	3.1	28	17.4

The study assessed that to what extent the micro and small enterprise members are exposed to pay additional costs to compensate the gap of integrated infrastructure provisions. The results show that due to lack of accessibility of roads, water supply and electric power, 57.8%, 84.5% and 81.6% respondents respectively pay an additional cost ranging from minimum 100 birr up to more than 1000 birr per month.

**Table 2: MSE's and payments of additional costs/ losses**

Amount paid to fill the gap	For weathered roads		For water Supply		For lack of electricity	
	Frequency	%	Frequency	%	Frequency	%
100-300	31	19.3	40	24.8	53	32.9
301-600	50	31.1	39	24.2	36	22.4
601-900	1	0.6	6	3.7	7	4.3
901-1000	11	6.8	51	31.7	35	21.7
None	68	42.2	25	15.5	30	18.6

## V. MSE's Level of Growth

The average growth level of the micro from the lower to the next higher level is 50% whereas the small level transformation to the next level of medium occupies 37.1%. The average level of transformation of the micro and small enterprises is 48.3%. As can be seen that the average achievement of transforming the micro and small enterprises into medium level was very low due to lack of access to infrastructure provisions and its interruption is the major challenge. Unfair distribution of infrastructure blocked the productivity of MSE's and these ceased the opportunities of job creation within the MSE's. Hageta (2007) states that micro and small enterprises cover more than 95% of all firms in Sub-Saharan Africa and their importance cannot be over estimated. The study also found out that gravel and earth roads occupy nearly 75% of the total road capacity in these areas which blocks the growth and development of MSE's and the residents of the areas.

**VI. Major challenges of integration among infrastructure provider sectors**

The study reveals that 73.3% believe that sectors awareness of cooperation and coordination is poor to very poor. At the same time the level of preparing joint sector plans, sectors having skilled man power, having detail implementing rules, directives and having organized coordinating system are 55.2%, 63%, 63.1% and 57.9% respectively.

During the study it was observed that at city as well as sub-city level there is no coordinating office to integrate the urban infrastructure in planning and implementation level. But the city administration technical committee tried to solve the immediate issues of projects during construction. Due to lack of central infrastructure integration coordination office, lack common planning system and incompatible infrastructure implementation blocked the efficiency and effectiveness of service provider sectors, low level of MSE's production and productivity, increased compensation costs and failure to remember the location of underground utilities and damaged the constructed infrastructure were some of the problems seen on the ground.

**Table 3: The existing system of infrastructure integration**

Existing conditions of sectors	Very Poor (%)	Poor (%)	Moderate (%)	Good (%)	Very Good (%)
Sectors awareness of cooperation and coordination	42.1	31.6	13.2	10.5	2.6
Sectors prepare joint plan	26.3	28.9	28.9	2.6	13.2
Have available skilled man power	23.5	39.5	21.1	7.9	7.9
Having detail rules, regulations and directives	36.8	26.3	13.2	18.4	5.3
Presence of central coordinating office	34.2	23.7	21.1	10.5	10.5

During interview with the relevant officers it was observed that lack of clear rules, regulations and directives, the knowledge of sectors responsible and accountability became decreasing from time to time. Following these trends sustainability of infrastructure and environmental protection became deteriorated from time to time. Having clear integration rules, regulations and directives help to support politicians ensure accountability and clear sectors understanding to implement the rules of integration.

It is recommended that the federal government should follow the decentralized institutional organisation to improve integrated infrastructure provisions. The government should take the responsibility of human development in data information system and infrastructure asset management plan helps to accurate knowledge about the alignment of the utilities. Also, the city administration should create awareness about cooperation, coordination, urban planning, integration, joint planning, implementation and sustainability of all infrastructure providing sectors.



## **VII. Conclusion**

An integration of physical infrastructure facilitates the efficiency and effectiveness of resources. The existing accessibility of integrated infrastructure provision for the MSE indicates that at least most of the MSE's members have little access to water supply and electric power lines and some of them are not benefit with all weathered roads. As a result, the productivity, growth and transformation of MSE's are blocked. Most of the MSE members are exposed to pay additional costs for the services of transport, water supply and electric power to fill the gap with poor quality, difficult to get the services in time and are too expensive at the same time. The absence of central integration infrastructure coordinating office are exposed to lack of institutional integration, low level of communication between service provider sector and inefficiency and ineffectiveness of service delivery system.

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