Growth and spatial development modelling

Recently, while watching TV, I saw an advert floated by Liberty Life. This advert reflected on the vision of the original Sandton City development and showed the developers standing in a large open veld area where they intended to do their development and with no other developments in view (see it here). We all know what the surrounding area looks like today! The question is: could one have predicted and modelled how this development would take place over the years?

Before answering this question, it is apt to explain why this question is pertinent. In spite of the incredible commercial success story that the development of Sandton represents it also represents a significant failure in the planning and development of infrastructure. Anyone who has spent hours snarled-up in the traffic in Sandton will attest to that! It is obvious that the city fathers never in their wildest dreams foresaw the growth in the area and the demands it would put on the infrastructure. As a consequence the road network that links Sandton to other commercial and residential nodes such as the Jo'burg city centre, Randburg and Roodepoort are woefully undersized. To make matters worse, there is not much that can be done about it, as there is simply not the required physical space. So, success yes, but it could have been so much better!

So, back to the original question - could it have been predicted and modelled and (by implication) better planned? The answer is yes!

How is growth and development typically modelled?

The most common technique I have found in industry to project and model growth and development is to project the (resident) population in an area. Problem is, that does not tell us anything about the commercial development of the area and as such it is not very useful. As an example, two areas of similar size could have similar resident populations but with total different development profiles. To provide more insight in this regard, the projection could be supplemented with a projection of the total employment in the area. That would allow better differentiation between the two areas but it certainly would not provide nearly enough information to plan the infrastructure properly.

This dilemma of how to project and model growth and development so that infrastructure can be planned properly is experienced worldwide. In South Africa, most cities can boast their success stories like Sandton City – Mennlyn in Pretoria, Century City in Cape Town etc. By default, the planning of the infrastructure lags the development, instead of the other way round! Sometimes it is possible to rectify the consequences of this through significant re-planning and upgrade of infrastructure.

My associate Jon Lijnes and I have been confronted with this same dilemma on a number of projects during the past 10 years. We quickly realised that the failure of infrastructure planning and implementation so severely experienced in this country stems from translation failures. The ability to translate from a development vision to actual bricks and mortar placed in the ground over a (long!) period of time is the 1st translation required in the infrastructure planning process. Equally important is the 2nd translation, which is the ability to translate from bricks and mortar in the ground to actual demand for services and thus the infrastructure that will be required to supply this demand.

These two translations outlined above are key in the infrastructure planning process that (should) happen daily in government – taking a development vision and developing a suitable strategy to achieve that vision and then to development a suitable infrastructure development plan which will guide and drive the implementation of actual infrastructure projects. This is illustrated in the diagram below.
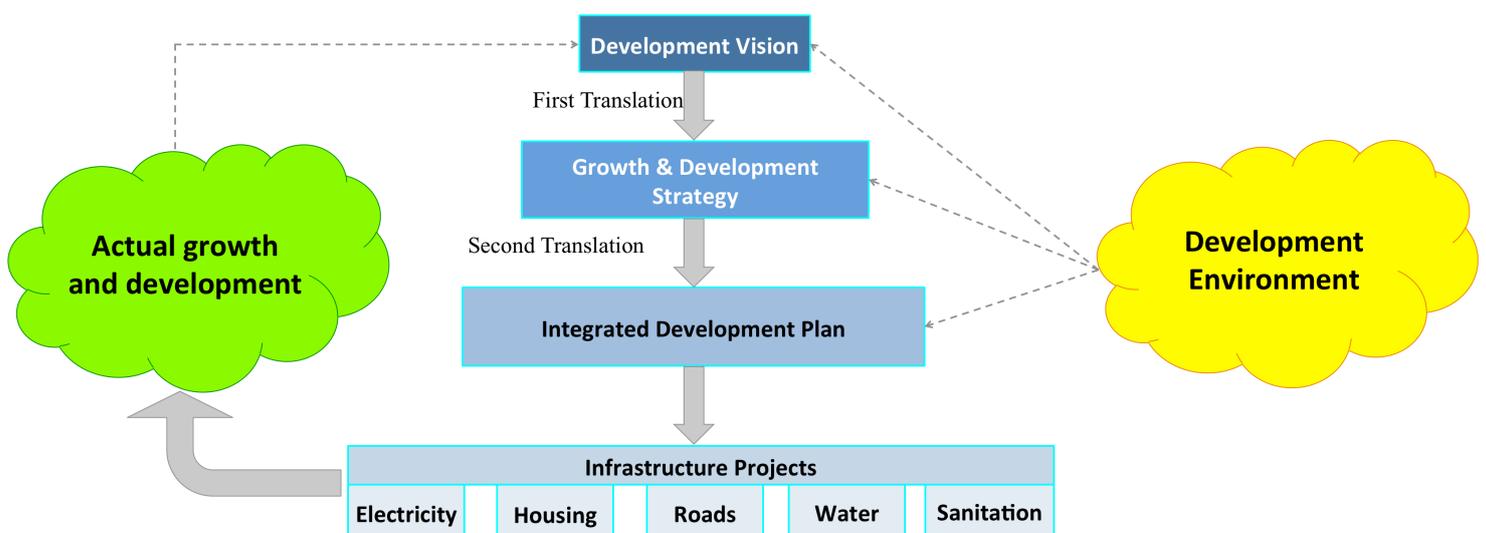
Only through the development of infrastructure will any growth and development be

stimulated. If the wrong infrastructure is constructed, the actual growth and development will not (closely) match the Vision. It is clear that if either (or both) the translations goes awry then that is exactly where one will end up.

So important are these translations in the infrastructure strategy and planning process that my associate Jon Lijnes and I embarked nearly 10 years ago to develop the tools to facilitate these translations and an appropriate planning process. The tools we have so developed comprise the following ~

Spatial Development Modelling: the ability to translate from a development vision to strategy hinges on the ability to model current and future spatial development. Such a spatial development model will provide direct feedback to the vision and will thus ensure that translation errors are minimised. Think back to the Sandton City example – a suitable spatial development model would demonstrate to the pioneering developers what the ultimate outcome of their initiatives could be, thus reaffirming their vision. We have developed such a spatial development modelling technique that enables accurate translation as well as future projection.

Demand Modelling: the next critical tool is one that translates from the spatial development model to demand for various services. If this translation is done accurately then the infrastructure that needs to be developed can readily be identified. More importantly, this will provide valuable feedback to the spatial development model as well as the vision. As an example, the feedback to the spatial development model could include the amount of space to be left open for future road construction to cope with future traffic volumes. Feedback to the vision could include cost information around the infrastructure required – a valuable element to facilitate a reality check. When we look at the Sandton City example, it is clear that this is the translation that failed completely and is responsible for many of the problems we experience in Sandton daily.

More detail on our spatial development and demand modelling technique
The modelling tools for spatial development – and demand modelling developed by Jon Lijnes and myself have been applied and tested on a number of infrastructure projects. We are constantly refining, updating and evolving these tools and have packaged it as a single instrument: the *Claassens-Lijnes Demand Estimation Instrument* with a dedicated website (www.claassens-lijnes.co.za) where more information is available.