













reasonable, but still needs to be measured by concretely analyzing the annual tourist population over the past few years.

### 3.3 Discussion

These research results show that, the level of urbanization in Chengmai maintained a growth trend from 1990 to 2015, even accelerating from 2010 to 2015, and related to increased investment in international tourism on Hainan island. According to the universal laws related to urbanization development, speed of urbanization at Chengmai will slow down along with urbanization rate, crossing the turning point at 50%; At the same time, as urbanization and economics are each other's essential prerequisites, the speed of development will also be affected by the slowing trend in China's economic growth.

Chengmai must adjust the industrial structure by analyzing various factors affecting the development of urbanization to maintain the current growth rate of urbanization steadily and sustainably. Urbanization must reduce the reliance on industrialization scientifically and reasonably, with steady development in industry, tourism, and tertiary industries. This can be achieved by relying on the endowment of regional resources and comparative advantages of industry, actively seeking diversification from travel, science and technology, internet and service drives. To speed up the development of emerging and high technology industries, the county should make full use of the basic advantages and strategic platform at the Hainan ecological software park and the ecological wisdom new town to expand employment. It must enhance the tensile strength of the rural to urban population shift, develop tourism, business, finance and other service industries to revitalize the market dynamics and strengthen the motive force of urbanization. It must develop tropical high-efficiency agriculture, realize industrialization and modernization, and liberate the agricultural labour force creating conditions for agricultural population transferrals to other industries. The compaction of agricultural development will guarantee balanced urban and rural development, realizing scaled development of small towns, driving the urbanization process of large and medium cities.

Considering urban construction land planning, according to the "national new urbanization plan (2014-2020)", traditional of urban planning must shift from disordered expansion to reduction and inventory planning. It should advocate a compact urbanization path, with emphasis on intensive development of land to improve the quality of urbanization, avoiding the phenomenon of "reduced" city in the late development phase. In the planning field, the capacity for urbanization development and land demand must be calculated first in terms of a reasonable configuration between urban development and urban population scale. The development capacity must consider construction land and ecological environmental constraints, in combination with other constraints, such as food security, to reduce the phenomenon of idle and inefficient utilization of land. This will improve the efficiency of land output, setting up a space for sustainable development, balancing whole town construction with scientific and perfect development planning to realize sustainable development. The direction of urbanization development must be guided by legislative regulations. To date, the Chengmai county government has adopted the above-mentioned suggestions in the "multiple plans integration" program and has appropriately adjusted the total

scale of the construction land, combining plans with tourism development as the core.

### 4. CONCLUSION

Our research results show that, "population urbanization level forecast - driving factor analysis - urban spatial planning analysis", is feasible based on an evaluation of urbanization space development. And, has a certain meaning on guidance for rational distribution of urban space, control of the scale of development, for an improved quality of urbanization to promote high-efficiency intensification of urban space. At the same time, there are some problems: the grey GM (1, 1) forecasting model does not have convergence. Longer time series data is needed to enhance the forecasting accuracy, and the forecasting period should not be too long. Future work will address these issues.

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### REFERENCES

- Chen, C., 2008. Research on healthy development of urbanization. *Territory & Natural Resources Study*, (4), pp.7-9.
- Cao, M.X., 2007. Research on grey incidence analysis model and its application. Nanjing University of Aeronautics and Astronautics
- Hu, X.D., 2016. Study on urban construction land performance evaluation under new-type urbanization: a case study of Hubei province. China University of Geoscience
- Li, L.Y., 2013. Perplexity of inflection point at 50% urbanization Level—A Comparative study on rapid urbanization of typical countries. *Urban Planning Forum*, 2013(3), pp.43-49
- Liu, S.F., 2010. The grey system theory and its application. Science Press, 2010(5)
- Lv, Y., 2014. Regional spatial pattern of urbanization, the process and its response. Northwest University
- Wu, J., 2013. China's population urbanization rate speculation and statistical methods. *The World of Survey and Research*, 2013(7), pp.44-47
- Zhang, H., 2015. Analysis on coupling development of urbanization and urban land intensive utilization in China [J]. *Journal of South China Normal University (Natural Science Edition)*. 47(3), pp.127-133
- Zhang, L.Q., 2014. Urbanization and land intensive utilization of coupling coordination degree measure - in Anhui province as an example. *Urban Problems*, 2014(3), pp.75-82