



**ECONOMETRIC MODELLING OF THE INNOVATION PROCESS IN
UZBEKISTAN**

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A B S T R A C T	K E Y W O R D S
<p>This paper is dedicated to the analysis of factors affecting innovation in Uzbekistan taking the case of the Joint Stock Company “Uzkimyosanoat”. It involved obtaining primary data for 10 enterprises in the company and analyzing this data. Factors to be looked at were chosen as research and development, intellectual knowledge, human abilities, level of satisfaction, demand for changes, usage of ICT and product development, growth of enterprise.</p>	<p>Innovation, variables, econometric model, factor, enterprise.</p>

Introduction

Taking developed nations as an example, Uzbekistan as a developing nation and needs to expand its innovation strategy and the usage of knowledge economy in sectors in the economy. In the market economy, the progression of innovation effects GDP growth, employment, and increase the competitiveness in the world market. Innovation is a very wide area of study, and each industry has its own particular factors which may influence the development of innovation more. Each industry needs its own particular type of innovation and development. This particular paper will analyse the chemical sector in Uzbekistan and in particular try to identify the main factors which affect the innovation in this sector, taking the JSC “Uzkimyosanoat” as an example. The aims of the research were:

1. Clarify the meaning of innovation; critically identify the main factors which are affecting on innovation according to other research
2. Explore these factors for “Uzkimyosanoat” using primary data
3. Make econometric equations and model to show the quantitative influence of the factors of innovation Innovation is becoming a topic which many firms and governments are paying bigger and bigger attention to.

This is because of the fact that innovation means responding to the conditions, which are changing daily, and to the technologies that are getting more and more developed as we speak. The more innovation you have the better the country grows and the enterprises develop¹. Innovation influences the economy to prosper and grow thus leading to bigger employment levels and income in that

¹Industry Canada research publication programme, 2001. The economic determinants of innovation. Retrieved November 13, 2009 from <http://ftp.iza.org/dp3962.pdf>

economy². Innovation is a process, a strategy, a benchmark, leadership skills, management techniques and much more³.

LITERATURE REVIEW

Policies to support SME's are being implemented all over the world, and these policies include many factors in order to encourage innovations. Dr. Vigier stated that the EU stimulates an 'open innovation' model where knowledge and experiences are shared in between the people inside the networks. The EU aims to promote the interaction of a broad range of policy areas, such as structural funds, state aid policies, education and training⁴. According to OECD, in the CIS countries Research and Development does not have a significant impact on innovation. In the case of Small and Medium Enterprises the innovation can have either "capital equipment or input-embodied innovation" or "design innovation". Although not all firms make innovations, many have the potential to do so and according to their research those companies who have higher educated employees, introduced at least one new product, give a considerable weight to client satisfaction and research their markets, have good relationships with other companies, don't get subsidies or own patent⁵.

The UNDP states that the biggest tool to improve innovation in Uzbekistan is education⁶. According to the research made by the International Finance Corporation in 2005 SME's comprised 38.2% of GDP and 66% of the employment in Uzbekistan⁷. Thus developing this sphere through the use of innovations is becoming more and more important by each day. Not many researches have been made in small countries regarding determinants of innovation and their effects⁸. According to the 2007 Uzbekistan Presidential decree, industries are encouraged to innovate and modernize their technological process in order to be in the competitive world market.⁹ Research regarding innovation development policies in Uzbekistan are being studied by authors such as Karimov (2005)¹⁰, Bekmuradov A., Ishmuhamedov A., Akabirova (2007) has discussed the ways of developing manufacturing industry in Uzbekistan through the usage of innovation¹¹. Abdukarimova M., Madjidov Sh. and others. As the topic of innovation is relatively new to Uzbekistan, there has not been a lot of research done on it. Azamatov looked at the development of innovation and its.

² Sloman, J. and Sutcliffe, M., 2004. Economics for Business, 3rd ed. London: Pearson education Limited.

³ Kuczmarski, T., 2003. "What is innovation? And why aren't companies doing more of it?" Journal of Consumer Marketing, vol. 20, no. 6, p. 536 – 541

⁴ Leger, A. and Swaminathan, S., 2007. Innovation theories: Relevance and implications for developing country innovation. Retrieved November 19, 2009 from

⁵ OECD, 2000. Enhancing the competitiveness of SME's through innovation. (online)

⁶ United Nations Development Programme, 2008. "Catalyst of Innovation" Economic Outlook journal. Tashkent: CER

⁷ International Finance Corporation, 2009. Business environment in Uzbekistan as seen by Small and Medium Enterprises 2009.

⁸ Salavou, H., Baltas, G. and Lioukas, S., 2004. "The importance of strategic orientation and competitive structure" European Journal of Marketing, vol. 38, no. 9/10

⁹ Republic of Uzbekistan presidential decree, 2007. About Modernization of the production process, technical and technological development and competitiveness. Newspaper "People's Words" N52

¹⁰ Karimov, I., 2005. Our main aim is to make our economy a democracy and innovate, to modernize and develop our country. Uzbekistan

¹¹ Akabirova, D. N., 2008. Methods of developing the manufacturing industry in Uzbekistan. Uzbekistan

METHODOLOGY

According to the aims stated in the presidential decree on the 12th march 2009, all enterprises in “Uzkimyosanoat” are implementing 3 building projects, 7 projects with foreign investment decisions and criteria, 5 new projects are under construction. By 2009, “Uzkimyosanoat” has started to produce 18 new products worth 15 billion soums. Identifying the main factors which influence the innovation in this enterprise will help the chemical industry develop more by paying more attention to those factors and adopting necessary policy tools. Previous work of scholars will be reviewed and factors to be looked at identified. It has to be taken into account that this works make a sophisticated econometric model that will serve as a statistical tool but to analyse innovation and make a step further to try and find some influences to the innovation process and development. The Center for innovations main aim is to work to develop the whole enterprise, find the best targets to achieve; control already implemented researches, think of new projects in order to produce new products. The innovation projects proposed are being implemented. A large proportion of the implemented projects are trying to produce new goods instead of imported goods used. “Uzkimyosanoat” has taken part in the 2008-2009 “Innovation ideas, technologies and projects” fair with 20 new projects. These projects were presented and certificates, patents, new product usage advices obtained. The patents obtained for innovation usage, rationalizing certificates are the documents which show that they are new and giving them the ownership rights on the innovation. For example “Ammofos-Maksam” owns 9, “Maksam-Chirchik” owns 5 patent rights in the Republic of Uzbekistan²¹. According to the CEO of the Company, Mr Gulomov, this work in the shpere of innovation is still not enough and needs to be developed further²². In order to make a regression and obtain an econometric equation, factors or independent variables to be tested needed to be chosen. As there is no exact model for calculating innovation, a model will be created. After looking through many researches made which has been discussed in the literature review above, it has been chosen to make a model by using the factors shown in the table below. The reason for this is that in my opinion is that these factors play a key role in the company and its management and affect innovation significantly. The dependant variable will be innovation.

CONCLUSIONS

After 4 estimations of different models were attempted, the last estimation of the Log-Log model was chosen to be the most accurate model. The reason for this is the fact that the previous models such as the Linear model had very high coefficients, large p-values, small t-statistics, low D-W and the explaining power of the model other models were lower then the Logarithmic model. This model will further be discussed below and conclusion obtained from them analysed. The biggest problem of panel data is the fact that the problem of multicollinearity and autocorrelation among observations may occur; the reason is the fact that as observations are repeated this may mean that the observations are no longer independent from each other.²⁴ It can be seen that in this model that the sign showing that multicollinearity exists are not there. These signs are large variance and large confidence intervals, low t-stats but very high R-squares. Looking at the model we can see that these problems are not present. The problem of autocorrelation is tested using the Durbin-Watson D-statistics. The model that was chosen as the best representative, which is the Log-Log model has a DW d-stat of 1.89. From econometrics lessons we know that the closer the DW is to 2, the more it means that autocorrelation does not exist.

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