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## Statement of Research Interest

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Applicant Name: Nandita Barman

Program: Mathematics (PhD)

### Interest to Research Area

Researcher is not a profession, but it is a way of gather knowledge in a specific field of interest. From my childhood I wish myself to be a teacher. Though after ages I feel that a good faculty member is not completed without having a great interest in research. Curiosity and willingness led my cogitating process that encouraged me to settle down myself as a researcher. In the period of my graduation and post-graduation level, for the first time I had a connection with the research that fascinated myself towards research in mathematics. I like to incorporate myself in research work such as Operation research, Time Series Analysis, Inventory Management System, Optimization, Financial Mathematics, Regression Analysis etc. Taking challenges to solve real life problem by using different mathematical equations boosts myself to be a researcher. It is well known to all that Mathematics is the mother of all sciences but in practical when I was in my under-graduate level there was very modest scope to know the practical implementation of theoretical knowledge. Only research makes available the practical execution of different Mathematical theory.

### Master's Research

I have completed my post-graduation with a thesis work on “Application of Advanced Forecasting Methods for Demand Forecasting of Private Car in Dhaka City”. As we all know that Bangladesh is a small with overpopulated country. Dhaka is the capital of Bangladesh. It has a lot of problems. One of the most vigorous problem is traffic jam. The inflamed number of private cars are a distressing factor for traffic jam in this city. It wastes our working hour, energy and makes our life annoying. Only intuition method was used for future prediction of private car in Bangladesh. Bangladesh Road and Transportation Authority (BRTA) did not use any mathematical method. It used only qualitative method to predict the future registered car of motor vehicle. The general objective of this study was to find the appropriate quantitative forecasting method for demand forecasting of private car in Dhaka city. This study tried to find out the mathematical way of forecasting value of the demand of private car in Dhaka city by using the time series models. In this thesis, the most appropriate short-term and long-term forecasting methods for forecasting the demand of private cars in Dhaka city were analyzed. There were several methods of time series forecasting in use such as Holt's Method, Holt-Winter's Method etc. This thesis concentrates on the Holt-Winter's Exponential Smoothing technique as applied to time series that exhibit

seasonality. Here, also proposed a modified Holt-Winter's multiplicative method so that it could incorporate the situation in our country. The accuracy of the out-of-sample forecast was measured using MAD, MAPE. Empirical results from the study indicated that the Modified Holt-Winter's Multiplicative Forecasting Method processes as the most appropriate forecasting method for the sets of data analyzed. This project was funded by Ministry of Science and Technology, Bangladesh.

### **Future Research Interest**

Inventory management system is an important mathematical modeling system that uses broadly in administrative judgment making such as a solution of finding low-cost production with maximum profits. It helps a lot in planning and decision making for any types of company. By the blessing of advance technology, internet provides the pharmaceutical industry to make available their production through both online and offline channel. Many countries pharmaceutical companies try to adapt themselves to expand their business with dual-channel inventory management system. Warehouse functions and capacity organization is the main problem that nowadays faces many managers for smooth production.

Strong health system is one of the major indicators of a developed country. A well-developed health system partially depends on a good management system of local pharmaceutical industry. Any healthcare system stands on good strategic management of productions and supply of medicines. It is necessary to pay attention on the inventory management system for better performance that creates a considerable competitive advantage. It is a great challenge for supply chain manager to make a balance in the inventory system considering in mind low production cost with maximum profit. Many warehouses do not have enough study on monitoring time management allied with retail and e-tail. Many of them have lack of knowledge that how e-commerce has exaggerated the warehouse functions. It is high time to give attention to improve this area.

Main purpose of the future study will be to provide a mathematical way of highest resource utilization with minimum costs by dual-channel well-organized scheduling in the warehouse of pharmaceutical industries. This research work may help us

1. To study existing dual channel inventory system in pharmaceutical industry.
2. To investigate the impact of the internet on inventory system in pharmaceutical industry.
3. To develop a model for smooth conduct of inventory system having both service of online and offline.
4. To make a comparison between existing inventory control systems and proposed model.
5. To find the positive and negative effects of dual-channel in pharmaceutical industry.

MATLAB, MS-Excel solver, TORA, SPSS and some require software will be used for data analysis.