Opinion

for the acquisition of an educational and scientific degree "Doctor",
D. A. Tsenov Academy of Economics – Svishtov

Reviewer: Prof. Eng. Dimitar Hristov Tenchev, Ph.D.

Grounds: No.406/30.06.2021 of the Rector of D. A. Tsenov Academy of Economics – Svishtov

Author of the doctoral thesis: Emre Zafer Guney

Title of the doctoral thesis: ALGORITHMS TO FORECAST WORKFORCE

I. General presentation of the dissertation:

The dissertation presented for review addresses an actual problem of modern sales management in large retail chains

In the context of a highly competitive and turbulent business environment, dynamic change of customer habits and behavior, the entry and expansion of on-line trading into everyday life, the demand for higher quality of service and, cost optimization, high effectiveness and efficiency in the planning and management of staff is a serious challenge for any organization.

The dissertation work is structured in 4 chapters, Introduction and Conclusion in a volume of 232 pages. 19 figures, 102 tables have been applied and 114 literary sources have been identified. In the Annex (in a volume of 38 pages) 48 tables are presented with the results of using the algorithm for planning the headcount in the context of the working hours, conform to the load (need for people and sales volumes) for different branches of Migros in Turkey.

In the context of the themes, in the Introduction are adequately formulated:

The **Object** of the study; **Subject** of development; the **Goal** of the dissertation work; the **tasks** to be decided to achieve this objective and the **Research Thesis**.

Chapter One focuses on approaches to management and staff planning in historical aspect.

An overview of the development of retail as a sector of the economy has been carried out and the trends in it have been brought to an end.

Changes in customer behavior and the need for flexible approaches to their service have been identified – taking into account shopping times and the focus of more service staff, through the implementation of appropriate working time schedules, wider qualifications and interchangeability, part-time recruitment people, etc.

One of the proper ways to increase the efficiency of the workforce is the development of work and shift schedules, tailored to the workload and staff requirement at different

working time intervals. For the dissertation needs, performance in three departments – Cashiers, Stockers and Butchers – was taken as an example.

Based on the studies carried out, the author justified the need to create an algorithm for developing work schedules, which covers two aspects of planning – staff requirement and sales volume in a corresponding time interval.

The frequency of data processing and rescheduling of the number of personal is set at 30 minutes.

At the end of the first chapter of the dissertation, the main highlights of the survey were drawn.

Chapter Two is faced to the subject of the study – the Migros retail chain. A parallel has been drawn with other similar global chains and outlines the general characteristics of this type of trade.

Chapter Three examines the development of an algorithm to meet the requirement for staff on the principle of customer and commodity flow in three departments – Cashiers, Stockers and Butchers.

An algorithm has been developed to research the workload of each of the 3 departments, which must take into account the staff requirement within every 30 minutes.

The times for real work, rest and the loss of time during different working hours for each of the departments are measured and discussed in detail.

In my opinion, various factors for categorizing different times have been adequately applied in assessing the workload of cashiers and, through the implementation of the Python programme tools, an objective 6 step algorithm has been created to predict headcount for different working time intervals.

By the same fully relevant way the working time for stockers and butchers has been examined.

In the last two departments, a similar 4 step algorithm was applied in the conduct of the study. In my opinion, it covers relevant data sources, conducts adequate calculations and delivers reliable results.

The summaries made at the end of Chapter 3 make it possible to confirm the positive opinion on the representativeness of the studies, analyses and results carried out.

Chapter Four is dedicated to the design of personnel scheduling algorithms for each of the three departments in Migros.

In essence, the algorithm is based on a mathematical model that compares the results of situations where there is an overstaffing, there is a shortage of staff and cases where there is

a complete correlation between requirement and availability of staff in the respective time period.

At the heart of comparing the traditional way of managing stores with three or four shifts of staff and the proposed algorithm is to achieve efficiency. It is calculated using scheduling Efficiency Ratio (SER).

II. Assessment of the form and content of the dissertation.

The issues discussed in the manuscript are highly relevant.

The problem with staff management has been and will be in the focus of all organizations.

Achieving optimality in number and capacity of people in the job performance necessarily goes through adequate forecasting and planning, something that is actually the purpose of the paper work.

The algorithms developed to measure the performance and assessment of the exact number of people for the three departments in Migros, I judge as adequate and reliable.

The researches and studies carried out are correct and relevant to the issues, and the results confirm this opinion.

The approbated staff scheduling model based on an algorithm and the actual result values make it possible to claim that the goal has been achieved, the tasks are fulfilled and the work thesis of the development has been confirmed.

The KPI - SER and PER used are objective and the calculated effect of optimization of the people allocation in different working time zones confirms the usefulness of the proposed iterations.

The working language of the dissertation is English and in this sense the terminology is completely correct and in the context of the topic.

The methods of research and analysis used are adequate. The mathematical model and the created algorithm are suitable and workable.

The abstract of dissertation is developed and presented in the appropriate form and covers all important aspects of the dissertation work.

III. Contributions of the dissertation work.

Four contributions were requested in the context of the dissertation work. In my opinion, contributions 1 and 4 have a Practical-applied characteristic and 2 and 3 Scientifically-applied type.

The mathematical model for measuring the efficiency of the work of the algorithm for planning personal's headcount is essentially a new idea.

The potential savings achieved financially for each of the three departments confirm its relevance to the practice of the retail chains, and possibly to other economic sectors and branches.

IV. Questions on the dissertation.

✓ The resulting economic effect is in terms of business – reducing staff costs. It is not clear what people who are already in the working environment will do at a time when the required number is less than their availability. They probably wouldn't go home and go back to work in 30 or 60 minutes when the model assessed a higher need for staff. The time for which they will not perform their direct work is actually also paid if they are on the territory of the store.
How will this affect predicted efficiency?

✓ The model of Lidl store chain, to work with fewer people, but with high interchangeability, is not it more advantageous?

✓ Do the store managers tend to apply such a model for staff planning and developing work schedules.

V. Summarized assessment of the dissertation and conclusion

In conclusion, I would like to declare my **positive assessment** of the dissertation submitted by **Emre Güney**. It meets the requirements of the Law for Development of the Academic Staff of the Republic of Bulgaria and the Regulations for Development of the Academic Staff in D. A. Tsenov Academy of Economics – Svishtov and covers the scientific indicators for the acquisition of educational and scientific degree "Doctor".

I allow myself to propose to the honorable Scientific Jury to **vote positively and to award Emre Guney an educational and scientific degree "Doctor"** in the scientific field 3.8. Economics; Doctoral Programme Economics and Management (Industry).

Review author: ………………
(Dimitar Tenchev)

Date: August, 2021