SILESIAN UNIVERSITY
SCHOOL OF BUSINESS ADMINISTRATION IN KARVINA

Statistical Methods for Economists – Week 8

(Questions and Tasks)

The topic: ***Full factorial experimental plans***

1.) In the framework of full factorial experimental plans, what do we mean by a "factor"?

2.) What is the main idea or aim of a full factorial experimental plan?

3.) Describe the experimental procedure.

4.) Read the Problem 1 (Spring) from [1]: Tosenovsky, F. (2014). *Statistical methods for economists*, pages 108-115. Apply the method for the following problem.

5.) **The Problem**: Consider a local vendor who wants to increase her income from her bakery shop via advertising. She tried three means of advertisement: social media (SM), billboards (B) and TV ads (TV).

Factors and their (two) levels are given as follows in Table 1:

Table 1.

Factor	Symbol	lower level	upper level
		-	+
social media	SM	facebook	facebook+Instagram+TikTok
billboards	B	small billboard	large billboard
TV ads	TV	20 sec ad	40 sec ad

Then, the vendor designed and carried out the experimental plan, see the following Table 2. Output 1 and 2 are her earnings in USD (during 1 day).

Your task:

a) Evaluate factor effects (see Table 49 in [1]),

b) Evaluate statistical significance of factors' effects (see Table 50 in [1]),

c) Provide graphical evaluation of factors' significance (see Figure 12 in [1]).

d) Write down the regression model of the experiment (see page 115[1]).

Table 2.

Run	factor 1 (SM)	factor 2 (B)	factor 3 (TV)	Output 1	Output 2	Average
1	-	-	-	700	840	
2	+	-	-	650	690	
3	-	+	-	720	820	
4	-	-	+	660	740	
5	+	+	-	800	830	
6	+	-	+	860	850	
7	-	+	+	900	960	
8	+	+	+	980	940	