

# 2021-03-29 - M-BIT - Empirical and Design Science Research - 202000029

Cursus: M-BIT-202000029-2A M-BIT Empirical and Design Science Research 202000029

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**Tijdsduur:** 3 uur  
**Aantal vragen:** 9  
**Gegenereerd op:** 28 mrt. 2021

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*Exam Empirical and Design Science Research in Information Systems (202000029)*

**Date:** March 29, 2021

**Time:** 3 hours (9:00 – 12:00) + 25% for students entitled to extra time

## Rules

1. This test is an open book test, in which you are allowed to use any teaching materials we provided (e.g., lecture notes, tutorials, exam samples) or other internet resources you consider useful.
2. **When taking part in this test, each student declares that (s)he has read, understood, and agrees to comply with all the rules contained in this document. Furthermore, each student acknowledges that (s)he is aware of the fact that there will be zero tolerance for breaching these rules.**
  - Students are not allowed to copy-paste any piece of text from any source, study materials, the internet, etc. All answers should be written in own words.
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  - No other persons may contribute, write, or interfere in any way in any (part of a) test but the student taking the test. If such fraudulent behavior is discovered, it will be immediately reported to the exam board, leading to serious consequences for the parties involved.
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**Aantal vragen:** 9

**In totaal zijn 56 punten voor deze toets te behalen, 30,8 punten zijn nodig om voor de toets te slagen.**

**1** Please read the following paragraph carefully, and indicate your agreement to acknowledge that you have done so. To find more information, please consult the attached PDF.  
0 pt.

Zie bijlage: remoteassessmentwebsite.pdf

Please note that this question will not result in any points for your exam.

By testing you remotely in this fashion, we express our trust that you will adhere to the ethical standard of behaviour expected of you. This means that we trust you to answer the questions and perform the assignments in this test to the best of your own ability, without seeking or accepting the help of any source that is not explicitly allowed by the conditions of this test.

- a.** I agree
- b.** I do not agree

**2** Indicate the steps one has to follow when constructing and testing an IS theory.  
3 pt.

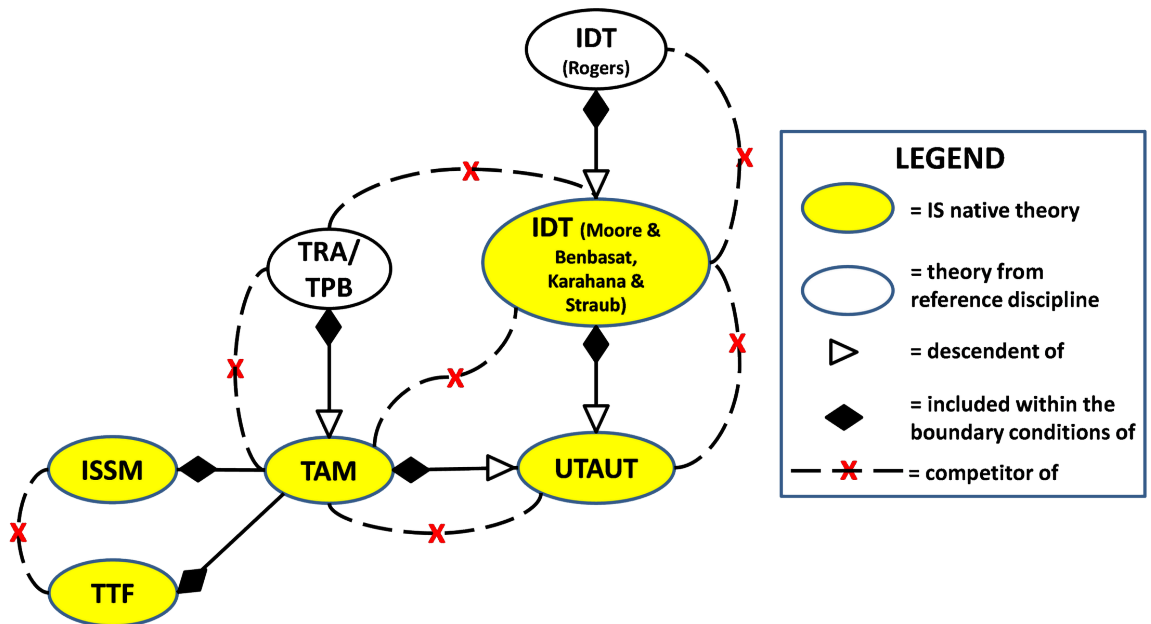
**3** How is the Information Systems field defined in the papers we discussed in this course? Give two definitions and compare them.  
3 pt.

- 4** Download and examine briefly the following paper (i.e., read the abstract and introduction):  
Carter L., Bélanger F., The utilization of e-government services: Citizen trust, innovation and acceptance factors, 2005, Information Systems Journal, Vol. 15, No. 1, p. 5-25.

Zie bijlage: utilization of e-government services.pdf

- 2 pt. **a.** A. Map the theory (i.e., the research model presented in the paper) using the notation we used in the course. Make sure that your diagram also includes the empirical indicators (if available), or at least indicate where they can be found.  
  
Prepare your answer in a separate file (containing diagrams and/or text) and upload it in canvas using the "Select file" button.
- 3 pt. **b.** B. Indicate which variables in your model are dependent, independent, moderating, mediating, latent, observed. NB: a variable can have more of the mentioned types.
- 6 pt. **c.** C. Calculate for your model the errors of inclusion, exclusion, nomological density, degree of separation. Does this model belong to the Information Systems field according to the criteria of Benbasat & Zmud?
- 4 pt. **d.** D. How was the measurement instrument constructed in this study and what do we know about its reliability and validity?
- 5 pt. **e.** E. What is the level of empirical support for the theoretical model proposed in this study? Explain the results of statistical analysis. How much of the variance in the dependent variable can be explained by this model? What statistics are used to confirm and measure the strength of the relationships in the model? What is their level of significance?  
  
Tip: when explaining your answer for this question you can also refer to the tables in the paper manuscript where this data can be found.
- 4 pt. **f.** F. Compare this model with two of the models we discussed during the course in terms of conceptual overlap (i.e., common or very similar constructs), and boundary conditions.

- 3 pt. **g.** Consider the diagram showing the theoretical models we have studied in this course. Extend this diagram with the model proposed in this study. Make sure you consider the right type of lines and arrow-heads when you do that. Motivate your choice.



Prepare your answer in a separate file (containing diagrams and/or text) and upload it in canvas using the "Select file" button.

- 5** For each of the following design problems, identify (1) the problem context, (2) the artifact, (3) the intended interaction of the artifact with the problem context, (4) two stakeholders. Some of this information is missing from the problem statement; in those cases, supply reasonable examples of the required items (state clearly that you invented these examples).

- 2 pt. **a.** (a) Our organization has a handbook of software engineering methods, but it is so large that no one uses it. Which set of methods and techniques from our "methods cookbook" are relevant for realizing IT-enabled business change?
- 2 pt. **b.** (b) Logistics in our organization is inefficient because it is still organized manually. Select and implement a logistic financial package with an eye to future IT developments.
- 2 pt. **c.** (c) Design a database system for storing annotated sensor data for use in a dike monitoring system.

- 6** Consider a situation where we need a database system for storing sensor data, annotated with time and data source information, as part of a dike monitoring system. The latter system should provide early warnings when there is a danger of dike collapse.
- 3 pt. **a.** (a) Formulate the design problem for the database system (artifact) according to the design template. In case the required information for a part of the template is missing, state what kind of information should be provided or state that you provided an example based on an educated guess.
- 4 pt. **b.** (b) Formulate the four knowledge questions of design science (effect, trade-off, sensitivity, requirements satisfaction) for the database system.
- 7** If you push a sequence of buttons on a coffee machine in an UT building, it starts making noise, produces a cup, and pours coffee in it. Suppose I have a craving for coffee and push the right sequence of buttons.
- 3 pt.
- Give a causal, architectural, and rational explanation of the phenomenon that it then pours coffee.
- 8** Consider the design theory that on busy airports, multiagent route planning reduces delays due to aircraft taxiing.
- 4 pt.
- For each of the usability requirements of this theory, give an example of why this theory is not usable and useful for a hypothetical airport.
- 9** Name two main differences and two important similarities between the Design Science Research Methodology (DSRM) (by Peffers et al.) and the Design Cycle (DC) (by Wieringa). When doing research, when is it better to use DSRM and when the DC?
- 3 pt.

Naam:

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Datum:

Geboortedatum:

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1  
0 pt.     A     B