MICROBE

Co-funded by the Erasmus+ Programme of the European Union

Minimizing the influence of coronavirus in a built environment

MICROBE

O2/A5. Development of the MICROBE Method

Project No: 2020-1-LT01-KA203-078100

MICROBE Method

MICROBE Method integrates coronaviruses and stress management techniques, Damasio's somatic marker hypothesis (Damasio, 1994); Russell's circumplex model of affect (Russell, 1980); emotional, affective, biometrics and the surrounding environment (pollution, noise, etc.) (pollution, noise, etc.) data; neuro-decision and neuro-correlation matrices; biometric and opinion mining methods; spatial analysis of categorical data by means of built environment analysis and multiple-criteria methods, for example, generation of human affective, emotional, biometrical states and the surrounding environment (pollution, noise, etc.) maps; neuro-questionnaire method; affective computing. It also involves statistical analysis (LOGIT, KNN, MBP, RBP), recommender technique and Web-based opinion analytics technique, as well as five methods for multiple-criteria analysis. Consultations will be held with scholars from foreign countries is expected regarding the integration of different research methods.

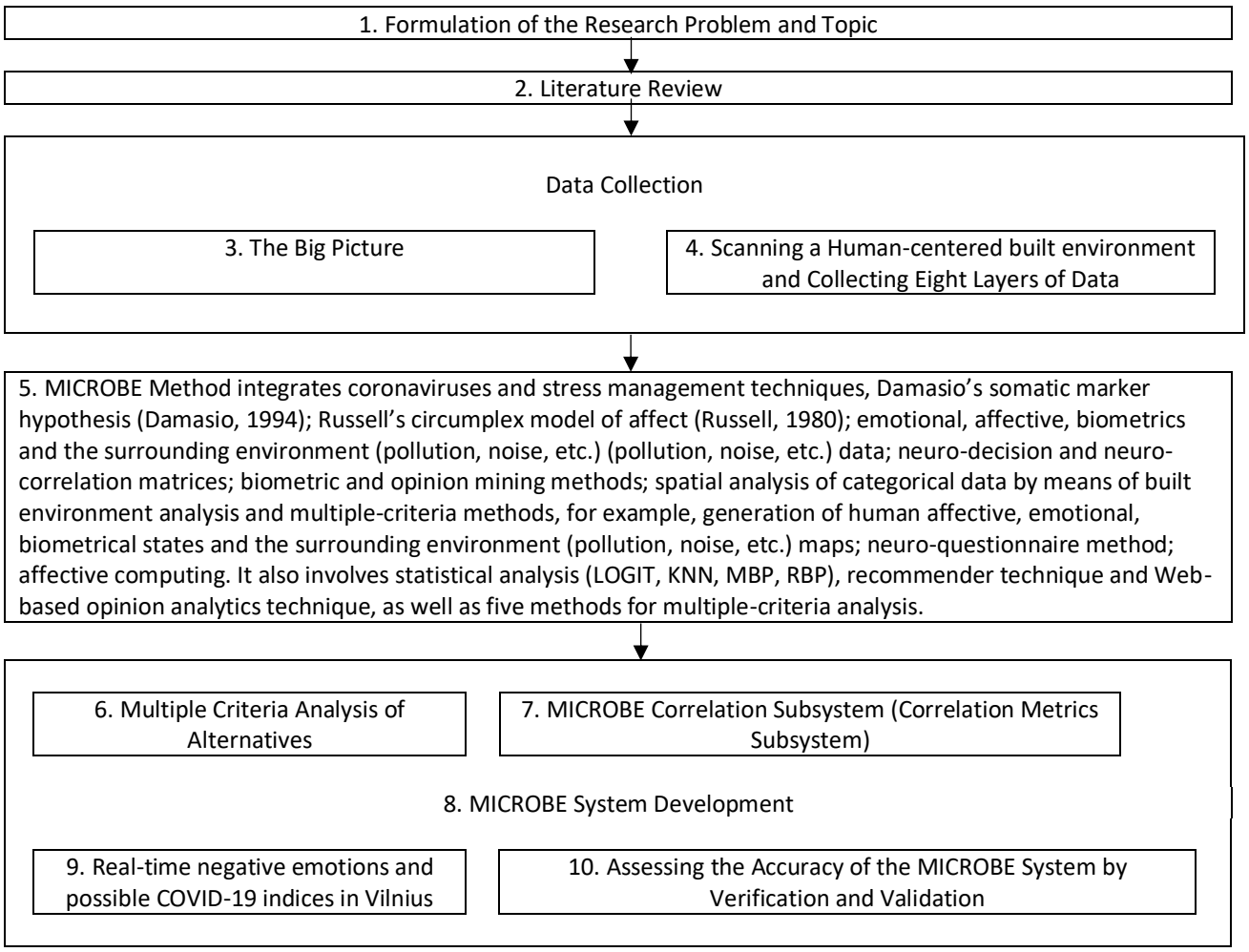

Fig. 1. MICROBE Research Design and Methods

This research employed experimental and non-experimental research design methods. Applications of several biometric techniques took place during the time of the experimental research design (see Stages 4 and 9).

The methods employed during the time of the non-experimental research design were correlational research (discovery of the relationships among variables under analysis; see Stage 8)

and descriptive research (Real-time negative emotions and possible COVID-19 indices in Vilnius). Real-time negative emotions and possible COVID-19 indices in Vilnius were during the time of the descriptive research design (see Stage 9). The purpose of collecting and analyzing the gathered data was to provide insights for stakeholders. Development of the research design involved eleven phases over the course of the research.

Next, the following introduces the eleven stages of MICROBE research design.

Formulation of the research problem and topic occurs during the first stage, at the time of the MICROBE research design. Further, into the third stage, the research hypothesis is formulated based on available knowledge and the literature analysis performed during the second stage. Presentation of the Big Picture of the smart, self-learning and adaptive built environment under research is in the fourth stage. Next, during the fifth state, scanning takes place according to this Big Picture of a human-centered, smart, self-learning and adaptive built environment along with the collection of eight layers of data. The Integrated MICROBE Method, developed during Stage 5, serves as the basis for the development of the MICROBE System during Stage 6. Performance of a multiple criteria analysis of alternatives with assistance from the MICROBE System occurs during Stage 7. Practical application of the Correlation Subsystem takes place during Stage 8 and implementation of Real-time negative emotions and possible COVID-19 indices in Vilnius during Stage 9. At the end of MICROBE research design, during Stage 10, verification and validation are employed to assess the accuracy of the MICROBE system (see Figure 1).

To date, the research performed in the human-centered, smart, self-learning and adaptive built environment was not accomplished by remote means (employing non-contact multiple biometrics). Various types of data (affective attitudes, emotional and physiological states, depression, valence, stress and arousal, pollution and human comfort in built environments) should be gathered in an integrated manner and serve as the basis for establishing thousands of average and strong correlation coefficients. The Big Picture defines the reality of the smart, self-learning and adaptive built environment. The smart, self-learning and adaptive built environment Big Picture multiple criteria analysis should use the Neuro Decision Tables for performing a project multiple criteria analysis, the establishment of different values (market, investment, user perceived, utilitarian, synergistic, hedonic and fair) and preparation various recommendations for stakeholders. This way, the MICROBE scientific problem is broadened and deepened, as compared with research conducted earlier by other scientists. The MICROBE scientific problem was not recognized as being the topic of research before. The research problem is, consequently, an enlargement of the human-centered built environment research with an application of the Integrated MICROBE method.

The topic of this study constitutes the analysis of different data (human affective attitudes, emotional and physiological states, depression, valence, stress and arousal, pollution and human comfort in built environments and other data) relevant to a human-centered built environment. The performance of this analysis involves applications of the Integrated MICROBE method consisting of multimodal non-contact biometrics, recommenders, statistics (LOGIT, KNN, MBP, Rprop), case studies and four multiple criteria, decision analysis methods developed by these authors.

Performance of the literature review was for recognizing the state of art in the field. The knowledge existing in the field under study was condensed during the literature review to cover the following questions: What is significant and not yet observed? How does this study contrast with research already performed? What is the status relevant to this? Is there recognition of the problems to which this research is responding? What other outcomes, if any, is this study inspiring or broadening?

Reference:

Kaklauskas, A. (2016). Degree of project utility and investment value assessments. International Journal of Computers Communications & Control, 11(5), 666-683.