

The Evolution of the Rapid Application Development (RAD) Concept in Today's Digital Transformation

Diana Kalibatienė, Asta Slotkienė, Jolanta Miliauskaitė

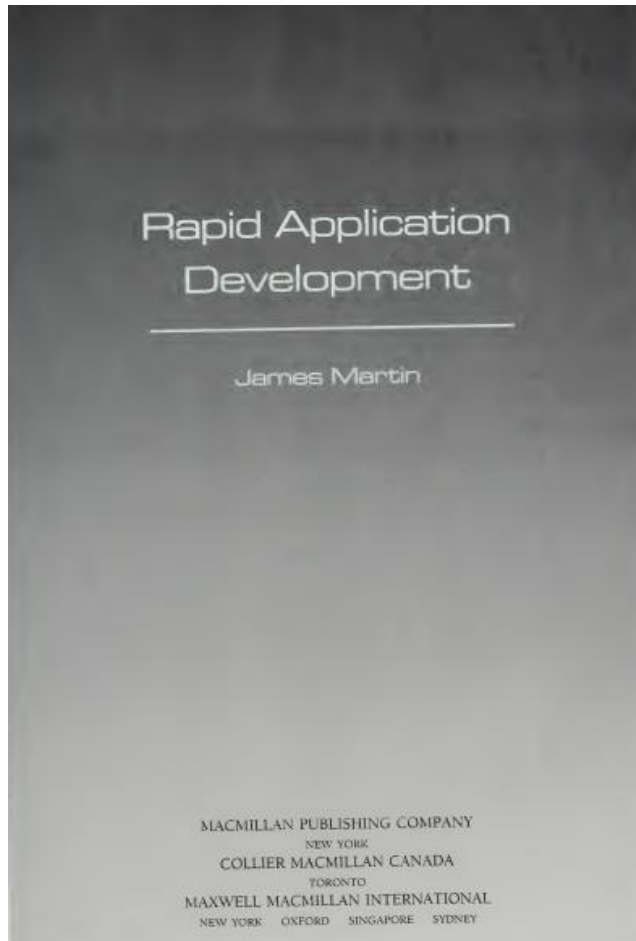


Funded by
the European Union

Agenda

- Introduction to RAD
 - Main concepts and viewpoints
 - Timeline
 - Approach to RAD
- Bibliometric Analysis of RAD
- Results and analysis of Bibliometric Analysis
- Erasmus+ RAD-Skills project outcomes
- Conclusions

Introduction about RAD



“Rapid Application Development (RAD) refers to a development lifecycle designed to give **much faster development and higher-quality results** than those achieved with the traditional lifecycle.” (James, 1991)

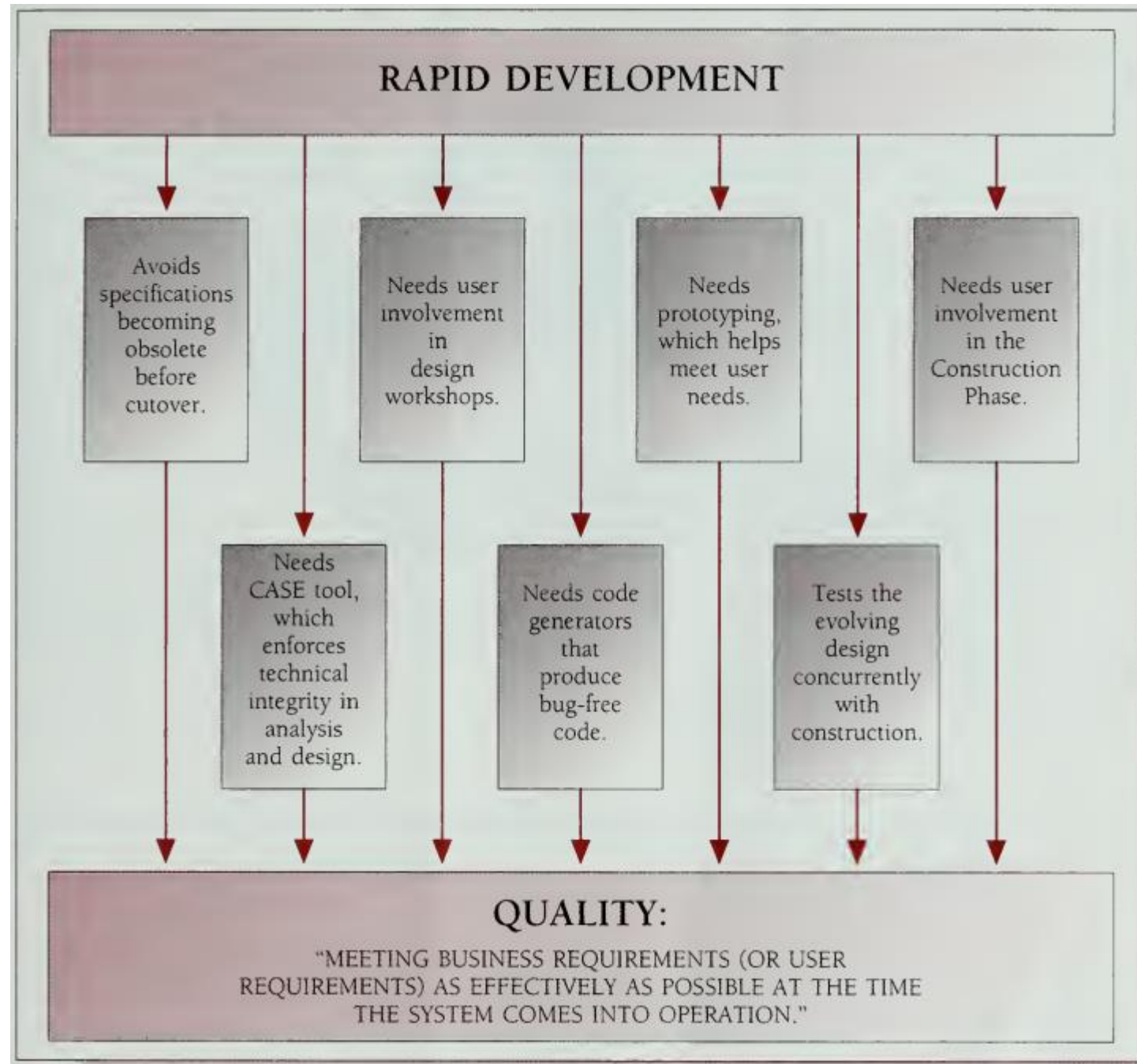
RAD is a software development philosophy that aims to produce fast and quality results

Martin, James (1991). [Rapid Application Development](#). Macmillan. pp. [81–90](#). [ISBN 0-02-376775-8](#).

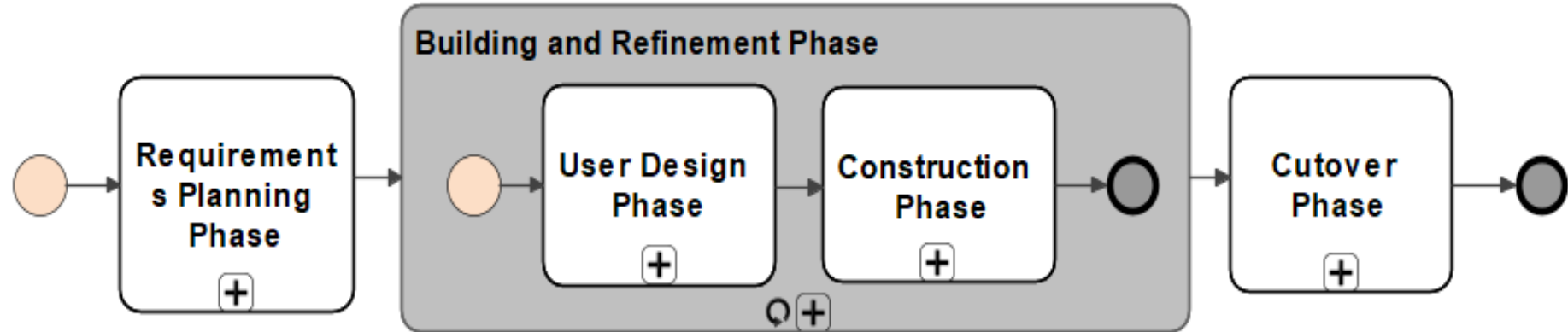
Introduction about RAD

- Concept of RAD by
(James, 1991, pp.5)

Martin, James (1991). [Rapid Application Development](#). Macmillan. pp. [81–90](#). ISBN [0-02-376775-8](#).



Approach to RAD



Requirements Planning:

- This stage is a **critical component of the RAD process**, ensuring that software development is aligned with future user benefits and existing business process constraints.

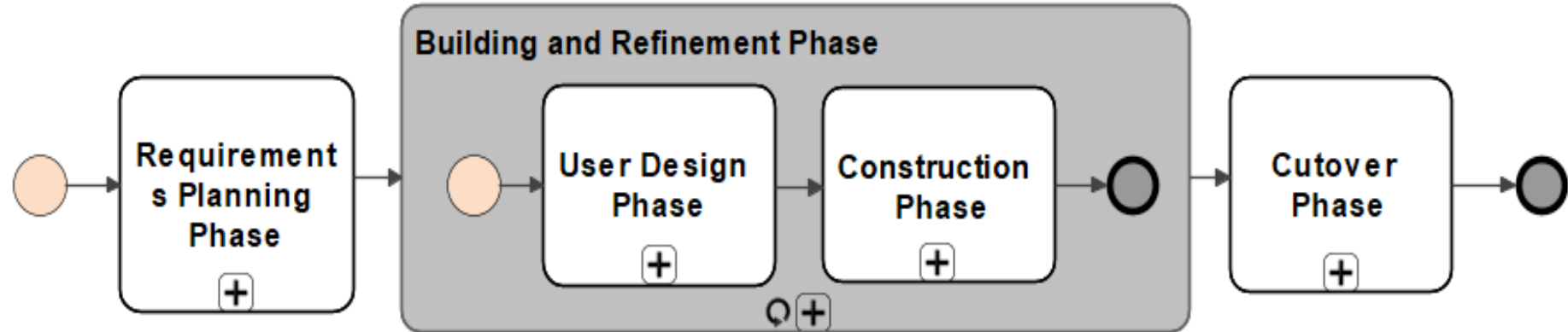
J. Martin. Rapid application development. Macmillan Publishing Co., 1991. Inc..

P. Beynon-Davies, C. Carne, H. Mackay & D. Tudhope. (1999). Rapid application development (RAD): an empirical review. European Journal of Information Systems, 1999, 8(3), 211-22

P. Beynon-Davies & S. Holmes, S. Design breakdowns, scenarios and rapid application development. Information and software technology, 2002, 44(10), 579-592.

H. Berger, & P. Beynon-Davies. The utility of rapid application development in large-scale, complex projects. Information Systems Journal, 2009, 19(6), 549-570.

Approach to RAD



User Design.

- This phase is essential for visualizing the system for users and making necessary changes before developing a full-scale application

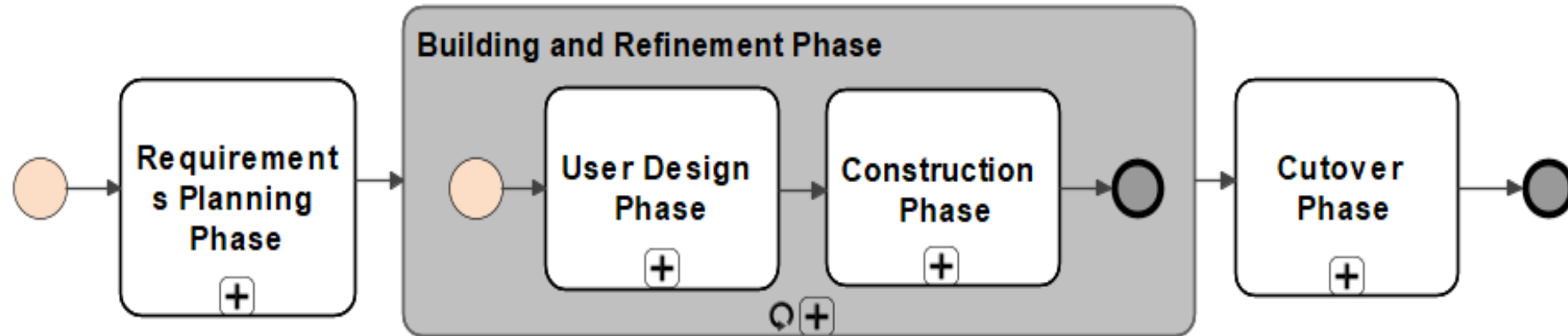
J. Martin. Rapid application development. Macmillan Publishing Co., 1991. Inc..

P. Beynon-Davies, C. Carne, H. Mackay & D. Tudhope. (1999). Rapid application development (RAD): an empirical review. European Journal of Information Systems, 1999, 8(3), 211-22

P. Beynon-Davies & S. Holmes, S. Design breakdowns, scenarios and rapid application development. Information and software technology, 2002, 44(10), 579-592.

H. Berger, & P. Beynon-Davies. The utility of rapid application development in large-scale, complex projects. Information Systems Journal, 2009, 19(6), 549-570.

Approach to RAD



Construction.

- The construction phase is characterized by fast and short development cycles, allowing for quick adjustments and refinements based on user feedback.

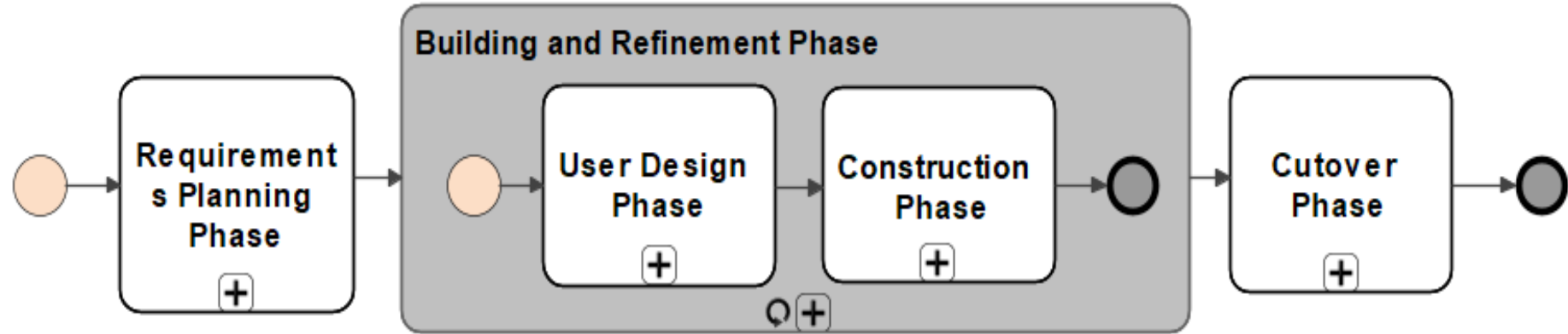
J. Martin. Rapid application development. Macmillan Publishing Co., 1991. Inc..

P. Beynon-Davies, C. Carne, H. Mackay & D. Tudhope. (1999). Rapid application development (RAD): an empirical review. European Journal of Information Systems, 1999, 8(3), 211-22

P. Beynon-Davies & S. Holmes, S. Design breakdowns, scenarios and rapid application development. Information and software technology, 2002, 44(10), 579-592.

H. Berger, & P. Beynon-Davies. The utility of rapid application development in large-scale, complex projects. Information Systems Journal, 2009, 19(6), 549-570.

Approach to RAD



Cutover.

- . This phase is critical to ensure that the system is ready for use.

J. Martin. Rapid application development. Macmillan Publishing Co., 1991. Inc..

P. Beynon-Davies, C. Carne, H. Mackay & D. Tudhope. (1999). Rapid application development (RAD): an empirical review. European Journal of Information Systems, 1999, 8(3), 211-22

P. Beynon-Davies & S. Holmes, S. Design breakdowns, scenarios and rapid application development. Information and software technology, 2002, 44(10), 579-592.

H. Berger, & P. Beynon-Davies. The utility of rapid application development in large-scale, complex projects. Information Systems Journal, 2009, 19(6), 549-570.

Methodology of Bibliometric Analysis



The main research question:

What is the intellectual structure of RAD in Computer Science?

According to MRQ, the following research questions (RQ) are defined:

RQ-1: What is the period covered by RAD?

RQ-2: What is the distribution of scientific papers about RAD among the Web of Science categories?

RQ-3: Which countries are considering the use of RAD?

RQ-4: What are the main topics being studied in RAD?

Methodology of Bibliometric Analysis



Searching Query (WoS database):

("rapid application develop" OR "rapid prototyping" OR "iterative develop*" OR "fast track develop*" OR "low-code develop*" OR "accelerated develop*" OR "speedy application creation" OR "quick app develop*" OR "incremental develop*")*

Methodology of Bibliometric Analysis



Database	<i>WoS Category</i>	<i>Document Type</i>	<i>Language</i>	<i>Search Result</i>
WoS	<i>computer science software engineering</i> OR <i>computer science theory methods</i> OR <i>computer science information systems</i> OR <i>computer science artificial intelligence</i> OR <i>computer science interdisciplinary applications</i> OR <i>computer science hardware architecture</i> OR <i>computer science cybernetics</i>	<i>article</i> OR <i>proceedings paper</i> OR <i>review</i>	English	5 045

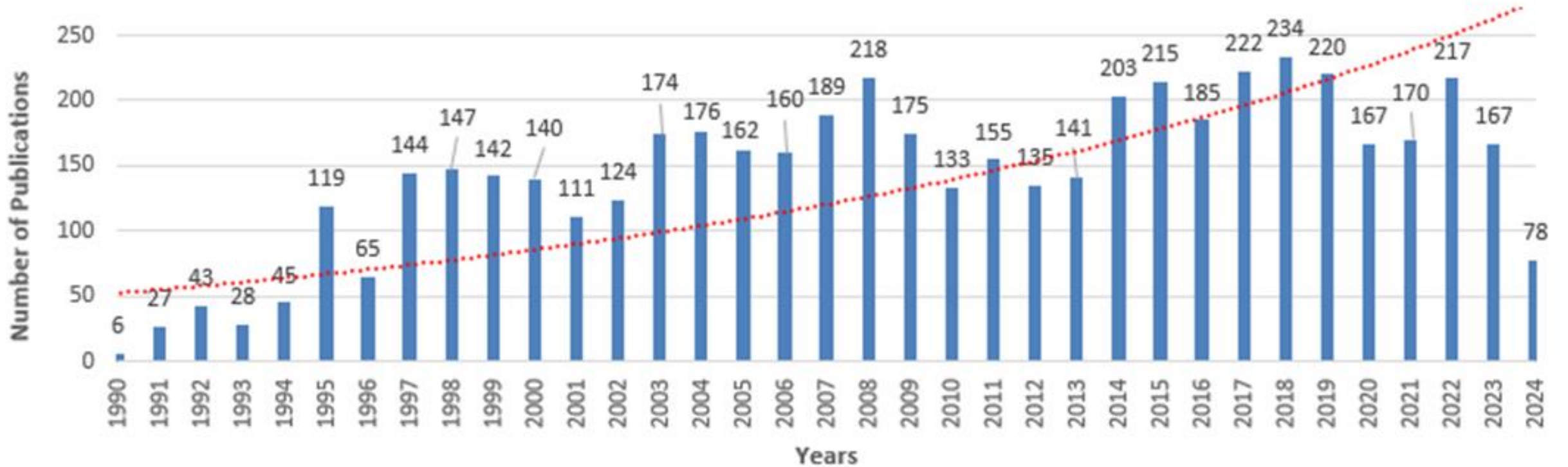
Methodology of Bibliometric Analysis



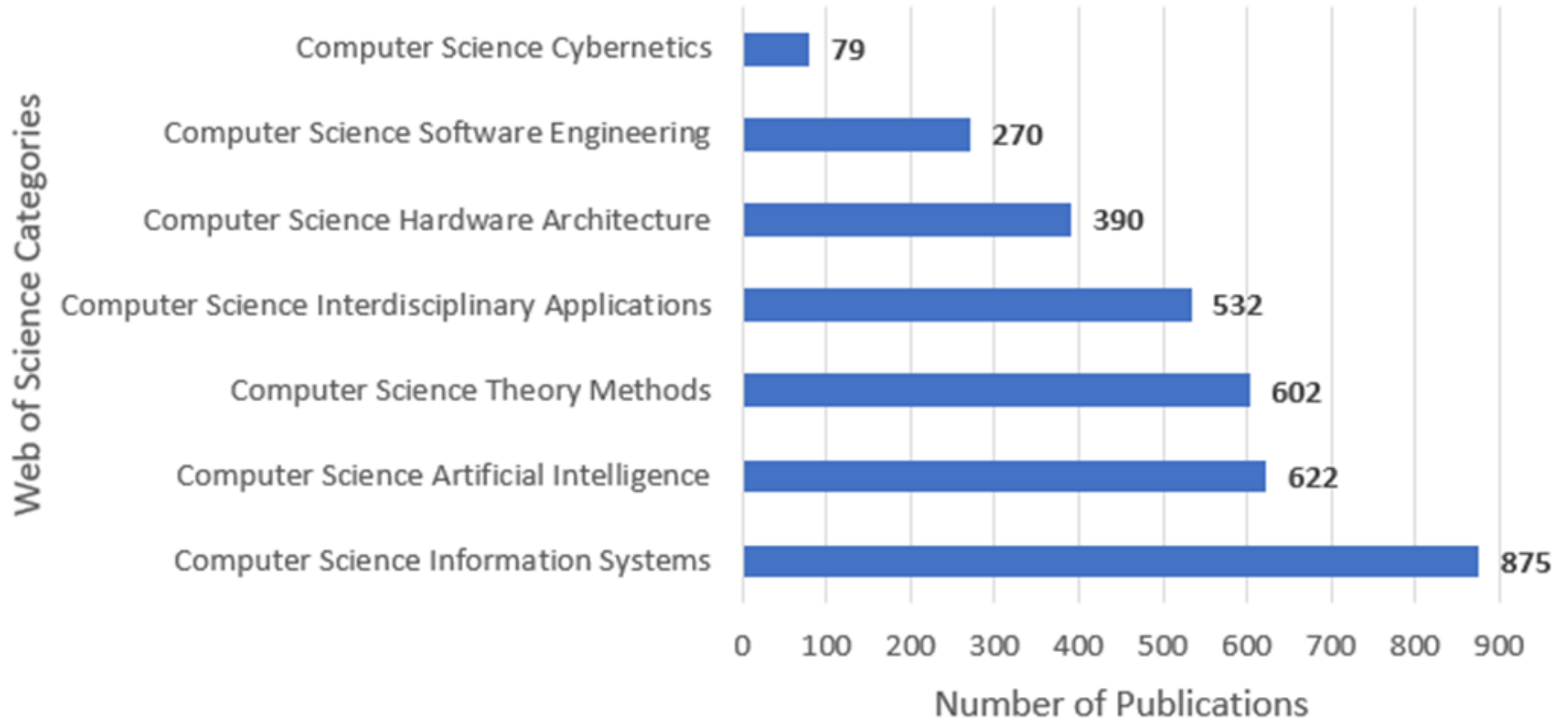
- Mapping:

A software tool for conducting and visualizing bibliometric networks
VOSviewer (<https://www.vosviewer.com/>),

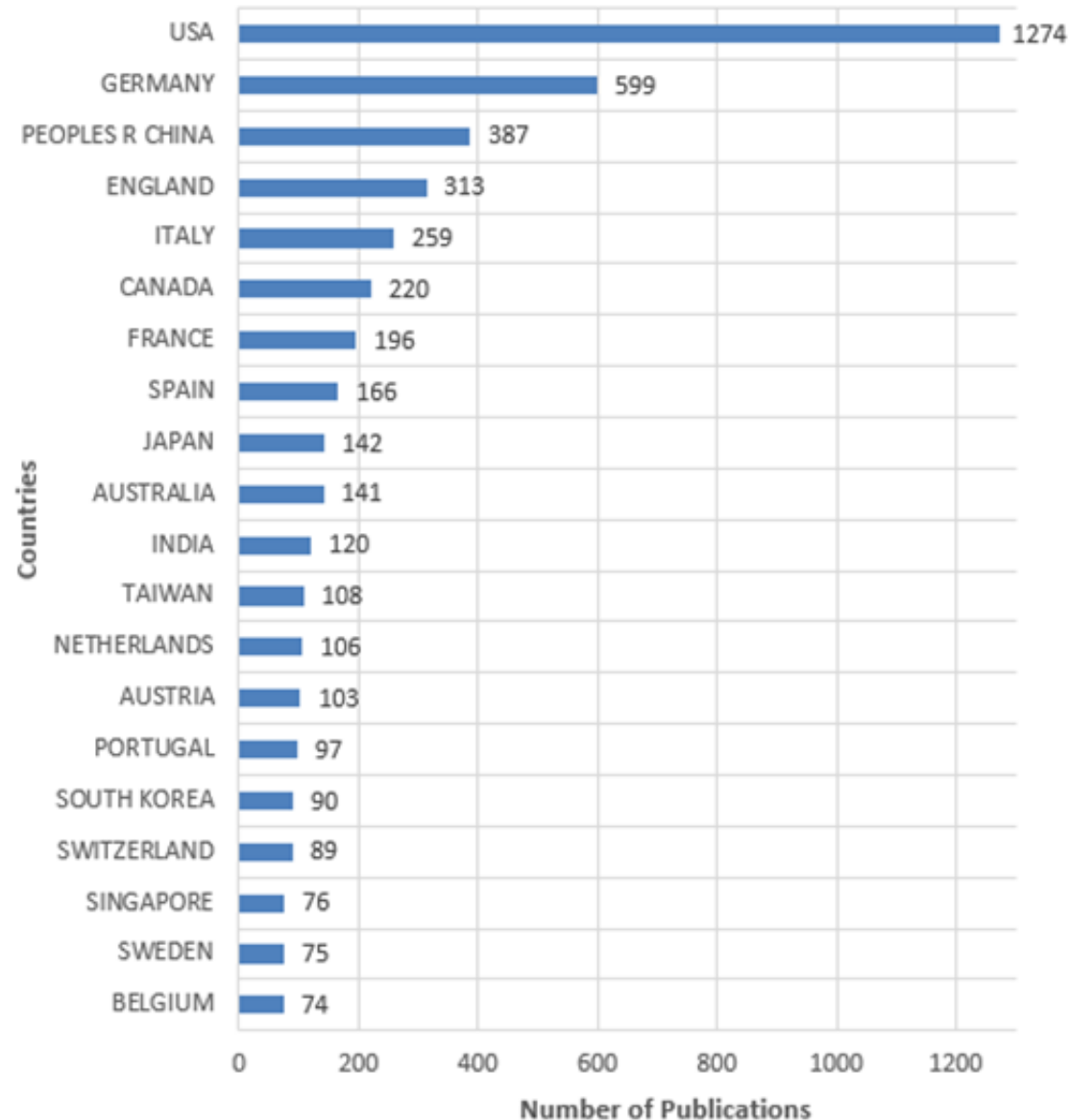
RQ-1: What is the period covered by RAD?



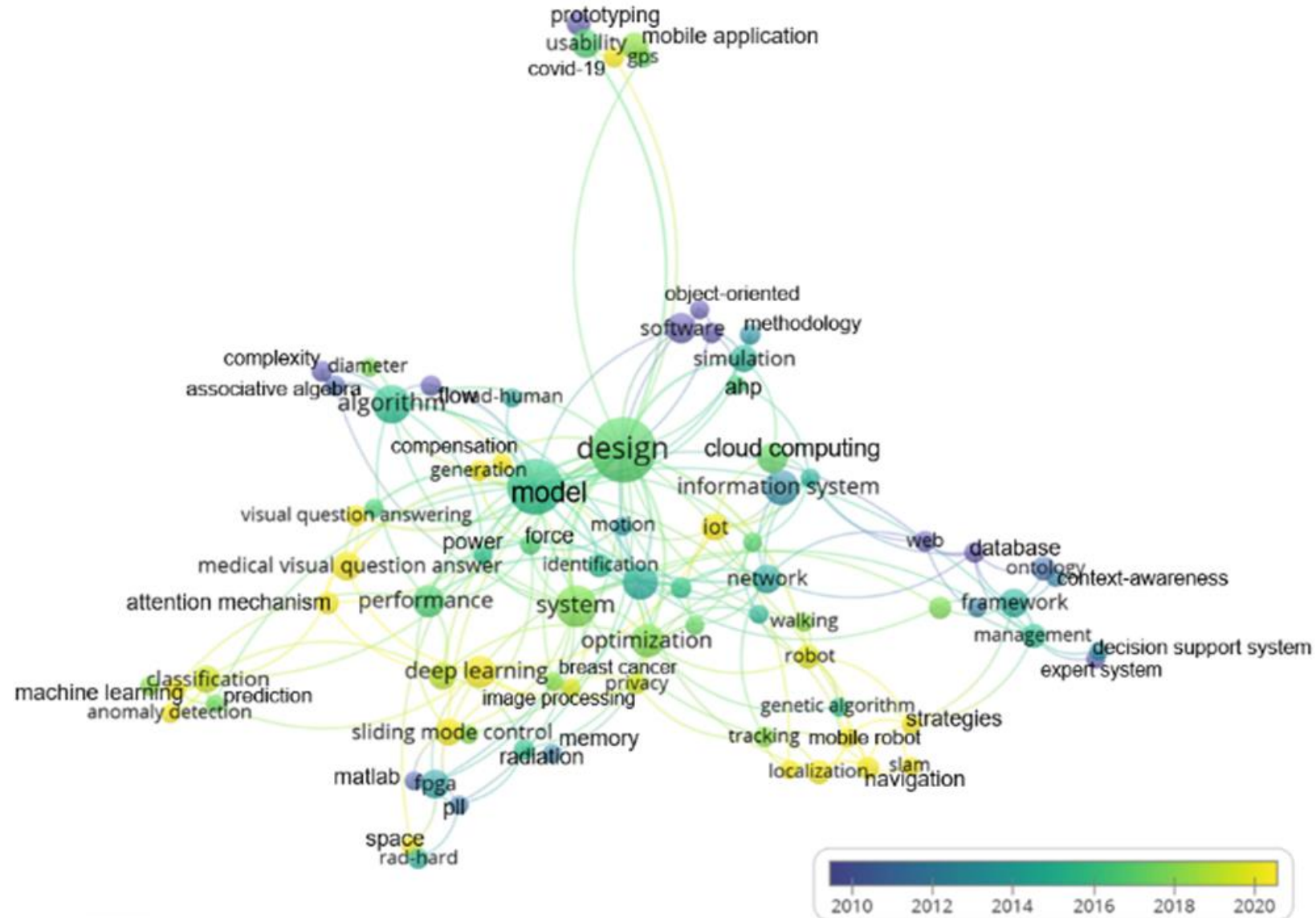
RQ-2: What is the distribution of scientific papers about RAD among the Web of Science categories?



RQ-3: Which countries are considering the use of RAD?



RQ-4: What are the main topics being studied in RAD?



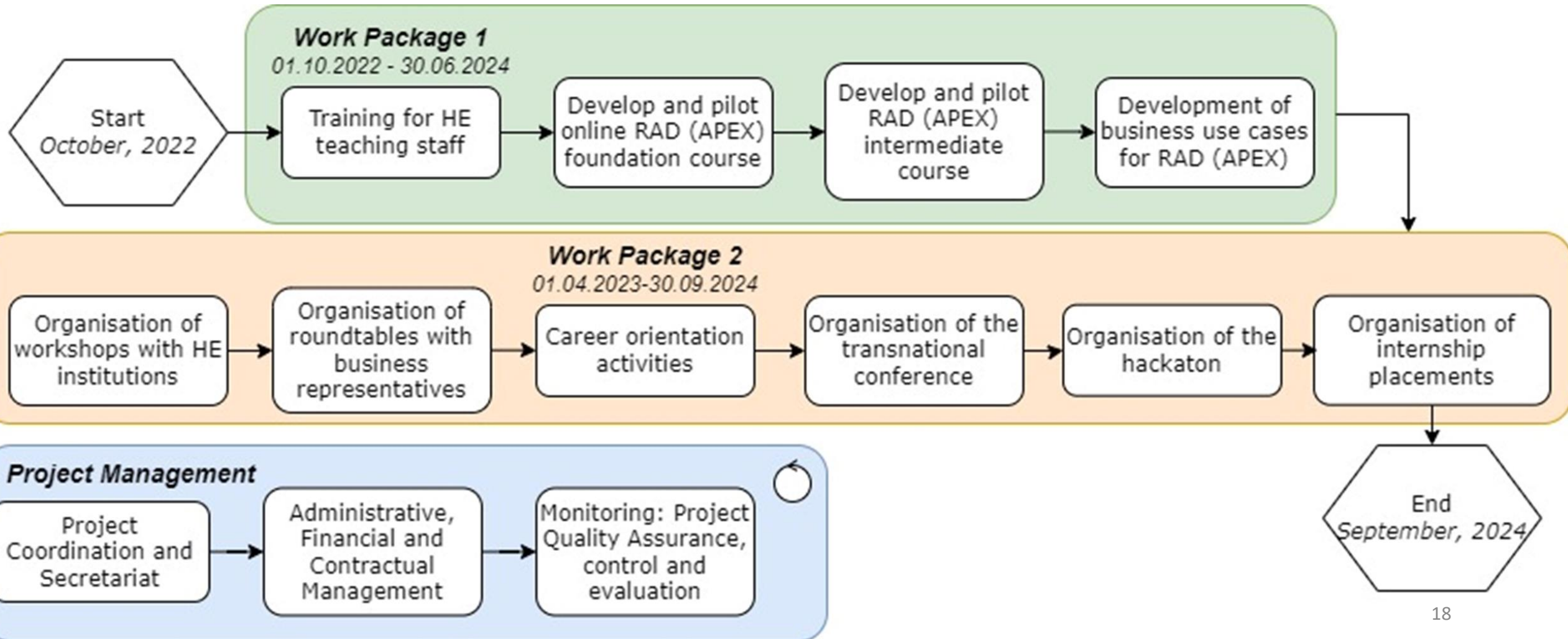
Erasmus+ RAD-Skills project

- KA220-HED Embracing rapid application development (RAD) skills opportunity as a catalyst for employability and innovation (RAD-Skills)
- The **project aims** to provide students modern engineering education consisting not only with in-depth technical knowledge but also of extended educational horizon, an entrepreneurial mind-set and socio-political sensitivity:
 1. the **development of foundational and intermediary courses**, 3ECTS each, for RAD, including teaching materials at 5 European universities in Ireland, Estonia, Latvia, Lithuania, Croatia, with a focus on Oracle APEX, emphasizing rapid development of web and mobile applications.
 2. **establishing the wide transnational** (at EU level), **national**, and **regional visibility of the project and its results** (outputs) for the most relevant stakeholders and wider audiences (local workshops, international roundtables, international conference, organization of internship placements).
- **Duration:** 01/09/2022 - 31/08/2024





Main Activities of the RAD-Skills Project



Main project results



- Foundational (Module 1) and intermediate (Module 2) level educational courses, each 3ECTS, for Rapid application development (RAD)
- 19 HE teaching staff received Oracle Apex training to deliver and support the RAD courses with the digital means in a collaborative manner
- The RAD curriculum, including e-book (only in English), assessment methods contain 5 sets in 5 languages EN, HR, LT, LV, EE
- For the pilot purposes the >100 HE students with engineering and business backgrounds had a content and learning experience with RAD tools.
- Business use cases and their development methodology created during the project) with involvement of business representatives as guest lectures.
- Multiplier events for HE, business, student, teachers audiences with the knowledge developed in the course of the project are conducted.



Conclusions

1. **RAD** as a software development methodology was originated in 1991 and is still **relevant**.
2. The discoveries of each period contribute to and **influence the RAD methodology** itself and its development, adapting it to contemporary **BizDevOps challenges**.
3. The bibliometric analysis conducted in the research indicates a significant **increase in the number of publications on RAD from 1990 to 2024**, reflecting the growing interest and application of RAD in various fields.
4. The research identifies the topics of RAD within Computer Science, revealing that the most common topics include **design, model, and algorithm**, while newer topics such as **deep learning, IoT, and mobile robots** are emerging, but not yet deeply explored.
5. The study finds that while RAD processes continue to evolve, they do not significantly alter essential software engineering processes. However, the **sub-processes and activities within RAD can change depending on the main business goals, indicating flexibility in its application**.



**VILNIUS
TECH**

Vilnius Gediminas
Technical University



Thank you

Questions ?



Funded by
the European Union