

Managing Information and Innovation (EBMN212225)

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S1 Reguler AR3 - Second Semester 2022/2023

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The course has no specific prerequisites

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Class Room: U-303 North Wing, FEB UGM

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1 Course Description

Managing digital technologies has become an essential requirement for any organization to remain competitive. Long-term sustainability for an organization may be determined by its ability to competently manage information and direct innovation resources to address a constantly changing market and economic environment. Technological innovation, knowledge, and information are playing fundamental roles in enabling radical new options.

This course helps address the practicalities of the challenge and places them firmly in today's new environment. It involves three primary resources: people, information, and technological innovation. Integrating those three aspects – and not just simply focusing on technicalities – is a real benefit this course attempts to achieve. However, this course will also introduce coding and programming as a means of teaching critical thinking and problem-solving skills. This course will also help you to develop skills for researching, strategizing, and implementing strategic changes.

This course provides an introduction to the nature of digital technologies, why organizations innovate, and how innovation can be managed, especially in firms. It begins with an exposure toward fundamental issues of innovation, such as the characteristics of digital technology, standards and network effects, the adoption and diffusion of innovations, the emergence of digital platforms, the advancement in recent technologies such as financial technology, artificial intelligence, machine learning, blockchain, as well as the impact of innovation on post-truth and disinformation.

The course is taught through a mixture of lectures and seminars. The seminar involves discussions focused on emerging topics and issues in relation to managing digital technologies. This course will also involve coding and programming (laboratory) exercise. There will also be group project and presentation that are closely complementing the topics covered in the lectures to reinforce the ideas and give them a practical application. There are no prerequisite courses for this course.

2 Course Perspective

Unarguably, managing digital technologies has become critical for redesigning the whole organizational processes. Consequently, the roles and duties of professionals in this field have also changed. Thus, it is

important for anyone studying this particular field to understand how the objectives of digital technologies in relation to the organizational goals.

Previously, the Management Information System course has been criticized for giving too much emphasis on the technical and technological aspects of the system (objects) and neglecting the role of people, culture, and other social aspects of an organization. It has also been suggested that the traditional views of information systems and innovation, which emphasize on technical orientation, may become one of the factors contributing to the frequent failure to meet organizational expectations.

More importantly, technological innovation is continuously changing at a rapid pace, making it difficult to catch up and integrate it into the curriculum. Thus, instead of focusing on the product technicalities and attributes, this course attempts to focus on the theoretical foundations to explain those phenomena. Put it simply, whatever new products and innovations emerge, there will always be infrastructures, standards, externalities, platform, artificial intelligence, and so forth. These are the *crème de la crème* of this course.

In addition to the theoretical understanding of the phenomenon *vis-à-vis* managing information and technological innovation, coding and programming skills will also be introduced. It is by no means that this course will teach students to become professional coders nor developers. Instead, the course is attempting to improve students' critical thinking and problem-solving while promoting technological independence. Thus, Python, an open and free software, will be introduced in this course as tutorials.

All in all, this course helps you adopt a more structured approach to managing information and digital innovation in an organization. The purpose of this course is to fill the aforementioned gap by providing a more updated and comprehensive view of how information and innovation can be managed within an organization. While there are many definitions and idiosyncrasies, the major characteristics revolve around the following areas:

1. **Organizational Processes.** This course focuses on the organizational aspects of information management and digital innovation, particularly its relevance in organizational activities such as strategic planning, decision making, resource allocation and utilization, performance evaluation, among others. This aspect will serve as the systematic framework for understanding the overall issues covered further in this course.
2. **Information Management.** Managing information is undoubtedly very important for decision-making in professional and personal life. In the age of information, there is no shortage of demand for qualified professionals who know how to manage information effectively. Students are expected to be able to appreciate the importance of information, analyze and evaluate information currently in place, and implement new strategies for improving an organization's processes to increase efficiency.
3. **Technological Innovation.** It is important for professionals in this field to design and implement solutions that enhance organizational performance. Students must possess skills and knowledge in relation to data, information, processes, systems, technology, and how those can be carefully defined, utilized, implemented, integrated, to help organizations achieve their goals.
4. **Analytical and Critical Thinking.** Professionals in this field should have strong analytical and critical thinking skills. Students must, therefore, be critical thinkers and problem-solvers, use systems concepts for understanding and framing problems, be capable of applying both traditional and new concepts and skills and understand that a system consists of people, organization, processes, procedures, infrastructures, hardware, software, and data.

5. **Ethical, Interpersonal, Communication, and Teamwork.** These skills are highly valued in most professional fields because individuals with strong acumen on ethics, interpersonal skills, communication skills, and teamwork tend to come hard by. Students must acknowledge that managing information and digital innovation in any organization requires the application of professional codes of conduct, require collaboration, excellent communication skills, curiosity, resilience, creativity, risk-taking, not to mention tolerance of these abilities in others.

Within each of these particular areas, key competencies have been identified and specific learning goals established in the following section.

3 Course Objectives and Outcomes

Learning Goals and Objectives of the Study Program

Completion of the course contributes to the overall learning goals and objectives of the study program:

1. Students demonstrate the ability to communicate
 - (a) Demonstrate the ability to deliver written reports through organization.
 - (b) Demonstrate the ability to deliver written reports through reasoning.
 - (c) Demonstrate the ability to deliver written reports through research method.
 - (d) Demonstrate the ability to deliver written reports through analytical thinking.
 - (e) Demonstrate the ability to deliver written reports through style.
 - (f) Demonstrate the ability to deliver oral presentations through structure.
 - (g) Demonstrate the ability to deliver oral presentations through use of media.
 - (h) Demonstrate the ability to deliver oral presentations through body language.
 - (i) Demonstrate the ability to deliver oral presentations through respond to question.
2. Students demonstrate the ability to work in team.
 - (a) Demonstrate commitment to team's objective.
 - (b) Understanding the duties and roles in team
 - (c) Demonstrate contribution to team meeting.
 - (d) Demonstrate individual contribution beyond team meeting.
 - (e) Demonstrate respect to other opinion from team member.
 - (f) Demonstrate respond to conflict positively.
3. Students have understanding about ethics.
 - (a) Demonstrate the ability to identify issues of ethics.
 - (b) Demonstrate the ability to make a choice based on ethical considerations.
4. Students demonstrate the ability to comprehend knowledge (in the field) of management.
 - (a) Demonstrate the ability to comprehend knowledge and skills on Business Process Improvements and Innovation

- (b) Demonstrate the ability to comprehend knowledge and skills on Customer Value Discovery, Creation and Delivery
 - (c) Demonstrate the ability to comprehend knowledge and skills on Value-Based Finance
 - (d) Demonstrate the ability to comprehend knowledge and skills on Leading Change
5. Students demonstrate the ability to lead others.
- (a) Understanding personal's strength and weakness in leadership.
 - (b) Demonstrate the ability to influence team member.
 - (c) Demonstrate the ability to inspire others through idea.
 - (d) Demonstrate the ability to inspire others through action.
 - (e) Demonstrate the ability to empower team member.

Course Outcomes

There is a strong need to introduce the concepts of digital technologies as well as its application within the organizational context. This course is thus heavily structured around seminars, discussions, group presentations, and case study method of learning for understanding the implementation of information systems and digital innovation in various organizational functions.

The overall purpose of this course unit is to introduce students to a range of foundational concepts in understanding the digital technologies. It will explore the characteristics of knowledge, processes, and institutions, and the spread of innovations throughout society. The course tackles key approaches and theoretical perspectives from the sociology and history of science, technology, and innovation to build a view of how economies are transformed through successive gales of creative destruction.

Upon completion of this course, the student will understand and learn the key principles of digital technologies in organizations so as to be able to use them to solve managerial decision-making problems and enhance organizational competitiveness, which could otherwise be not solved with conventional approaches. Moreover, students should be able to identify the strategies and apply methods for the implementation of organization-wide innovation management.

On completion of this course unit, students should be familiar with:

1. A range of key conceptual approaches for understanding the digital economy (CO1):
 - (a) The nature of innovation processes and the characteristics of digital technologies, and
 - (b) Principles involved in managing innovation and the development of technology in firms and the ways in which business strategies and technological competencies interact.
2. A range of frameworks, and the strengths and weaknesses of them, that are used in analyses of the strategic management of technological innovation (CO2).
3. Students will also develop the following soft-skills (CO3):
 - (a) Group working,
 - (b) Presenting critical arguments in seminars and presentations, and
 - (c) Basic research skills.

4. Ability to be creative, innovative, and solve problems more efficiently through hands-on coding and programming (CO4), and
5. Appreciate the recent technological innovation that is relevant to organizational performance and competitiveness in the digital economy (CO5).

In order to achieve the learning outcomes, it is expected that students will devote 120 hours to work on the course. Of this, only about 30 hours is formal class contact. Every student shall be doing the readings, pre-course videos, assignments, tutorials, group projects, and other work necessary without supervision. Each student should prepare his/her own materials that cover various concepts and cases dealt with in this course. Obviously, students need to come prepared with the reading of the topic to be discussed in the lecture.

Leading Indicators

A success indicator is a measurable value that represents progress towards the desired impact of a course. This course, in particular, seeks impacts that meet the following criterion:

1. Have a good understanding of how managing information promotes innovation (LI1),
2. Uncover the impact of the digital technologies and other potential benefits of innovation (LI2),
3. Improved knowledge on the fundamentals of architectural innovation and platform as infrastructures of innovation (LI3),
4. Have a good understanding of the way in which innovations are diffused through different channels (LI4),
5. Better explain the role of standards and network externality in technological innovation (LI5),
6. Realize the value of modular platform in developing innovation (LI6),
7. Identify potential areas of focus and opportunities to contribute to digital sustainability (LI7).
8. Appreciate the recent development of state-of-the-art digital technologies (LI8),
9. Have a good understanding of datafication, the politics of data, as well as surveillance (LI9),
10. Acknowledge the negative impact of technological innovation (LI10),
11. Get informed about programming and gain simple coding skills (LI11), and
12. Support students' continuous learning paths that enable students to stay relevant in a transforming digital landscape (LI12).

To measure this level of accomplishment, we will use a combination of metrics such as student's participation, quizzes, assignments, group presentations, as well as examinations. At this stage of evaluation, we will be able to determine whether the course is meeting its set objectives through well-designed content and appropriate method of delivery.

4 Required Readings

There is no required textbook for this course, though a diverse and ambitious set of readings will be required. Instead, this course is designed to heavily rely on recent academic papers in the literature. However, you may consult the following books to get a comprehensive idea regarding the topic and/or dive further into specific topics.

1. Dodgson, M., Gann, D. M., and Phillips, N. (Eds.). (2015) *The Oxford Handbook of Innovation Management*, Oxford University Press.
2. Fagerberg, J., Mowery, D. C., & Nelson, R. R. (Eds.). (2005). *The Oxford Handbook of Innovation*. Oxford University Press.
3. Jordan, T. (2019) *The Digital Economy*. Cambridge: Polity Press.
4. Kleinman, D. L., & Moore, K. (Eds.). (2014). *Routledge Handbook of Science, Technology and Society*. New York, NY: Routledge.
5. Schilling, M. (2017) *Strategic Management of Technological Innovation*, 5th edition, McGraw-Hill Education. (The 4th edition was published in 2013).
6. Tapscott, D. (2014) *The Digital Economy: Rethinking Promise and Peril in the Age of Networked Intelligence*. McGraw-Hill Education. (The first edition was published in 1996).
7. Tidd, J. and Bessant, J. (2018) *Managing Innovation: Integrating Technological, Market and Organizational Change*, 6th edition, Wiley. (The 4th edition was published in 2009 while the 5th edition was published in 2013).

To broaden your insight, however, do not limit yourself with the resources listed in this syllabus. Several articles from research journals related to each topic may also be passed out throughout the period of delivering the course.

5 Course Grading

Grading Policy

- 10% of your grade will be determined by your active and meaningful participation during normal class hours. Students should actively be involved in the class discussion by presenting their analysis of the reading materials, discussing it with their peers, and critically analyzing the theories and framework of digital innovation. Generally, ask questions, answer them, respect your colleagues, and enjoy the engagement activities.
- 20% of your grade will be determined by your submitted assignment. Occasionally, there will be a simple individual exercise that has to be submitted to measure students' appreciation toward the concept of the course, key frameworks in managing digital technologies, to the logic of programming and how it can be used to solve the problem.
- 20% of your grade will be determined by a group presentation. Every week, students should present the assigned issues/topics in digital management. This presentation is aimed to test the ability of the students to critically interpret and communicate the relevance of theories of technologies and relate them to contemporary cases and examples.

- 25% of your grade will be determined by a midterm exam.
- 25% of your grade will be determined by a final exam.

Grade Composition

Class Participation	10%
Quizzes and Assignment	20%
Group Presentation	20%
Midterm Exam	25%
Final Exam	25%

Letter Grade Distribution

≥ 93.00	A	70.00 - 72.99	C+
90.00 - 92.99	A-	67.00 - 69.99	C
87.00 - 89.99	A/B	63.00 - 66.99	C-
83.00 - 86.99	B+	60.00 - 62.99	C/D
80.00 - 82.99	B	57.00 - 59.99	D+
77.00 - 79.99	B-	55.00 - 56.99	D
73.00 - 76.99	B/C	≤ 54.99	E

Grades Interpretation

- Grades in the **A** range represent work that is **excellent**. It demonstrates substantial originality and understanding in identifying, producing, and communicating conflicting arguments, adequate perspectives or problem-solving approaches, as well as the ability to critically evaluate the problem, its solutions, and the implications of the problem.
- Grades in the **B** range represent performance that is **substantially better** than the expectations. Students demonstrate adequate understanding and application of basic concepts from the field of study, building arguments or decisions and providing acceptable justification, and communicating information and ideas adequately in terms of disciplinary conventions.
- Grades in the **C** range represent performance that **meets expectations**. To some extent, it shows a superficial or partial or erroneous (faulty) understanding of basic concepts of information management and innovation and the limited ability to apply the concepts. It indicates that students give an unsupported or improper argument, communicate information or ideas with unclear and inconsistent compliance with disciplinary conventions.
- Grades in the **D** range imply **real shortcoming** in understanding and applying underlying concepts. Students fail to demonstrate the major part or the whole part of learning goals.
- Grades **E** indicate that **no work** that can be graded.
- Grades **F** indicate that students **violate** code of conduct.

Class Participation

Each module will include one or more brief engagement activities related to the concepts discussed in the reading and listening materials and/or in the instructional videos. The goal with these engagement activities is to give you a chance to activate and demonstrate the knowledge you have gained in the class. Many of these engagement activities include opportunities for creative expression.¹

The success of this course depends upon students contributing to a thoughtful and sincere class discussion. During the synchronous session, each student is expected to take an active role and in such a positive way in creating a classroom atmosphere that is safe, engaged, and capable of bringing out the best in all students. Questions and relevant observations are strongly encouraged to enrich the experience of the students' learning experience. While hard work and determination represent the foundation to your progress and success, positive attitude and humor will not hurt. Do not forget to have some fun indeed.

When evaluating your participation in the class discussion, I will consider how effectively you put forth in your own arguments, as well as how well you listen to, understand, and build upon or refute the arguments of others. In all cases, I will look for high quality (which obviously is frequently not the same as high quantity) arguments, analyses, and questions that improve the class' collective understanding of the issues. While I encourage you to speak up at any time, keep in mind that comments that are redundant, tangential, or seemingly irrelevant or attempts to dominate class discussion will have a negative impact on your participation grade.

In every session, you should respect your instructors and your classmates, and we will return the favor. Respect includes creating an environment conducive to learning, which means being on time, turning off mobile phones, listening attentively, turn on the camera if being asked for, and actively contributing in the classroom. Make an effort to get to know your classmates, learn their names, and work with them in a collaborative and constructive spirit.

Those who are not able to demonstrate respect for their peers and alternative perspectives in the class may be asked to withdraw from this course offering.² If, however, you are struggling to find a voice in the class, or if you feel uncomfortable with anything that happens during class discussion, please let me know, and I will also reach out to you, so that we can work together to make this course the best it can be.

Your participation will be evaluated using the following criteria.

1. **Strong - 80-100.** You demonstrate excellent preparation and very active involvement. You contribute in a very significant way to ongoing discussion and offer analysis, synthesis, and evaluation of the topic.
2. **Good - 60-80.** You demonstrate good preparation by offering interpretation and analysis of course material. You contribute enough to discussion in an ongoing way.
3. **Fair - 40-60.** You show adequate preparation and demonstrate sporadic involvement. You offers straightforward information without elaboration or very infrequently when called on.
4. **Limited - below 40.** You present yourself in the class, but demonstrate very infrequent involvement in discussion.

¹Any time we are on Zoom/Webex, please respect the privacy of your classmates as we are virtually entering one another's homes.

²Professional courtesy and sensitivity are particularly important with regard to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, and nationalities.

Individual Assignments

It is expected that you complete all required readings and reflective questions prior to class. These have been structured in order to enable your ability to be an informed and active participant in dialogue and debate. Be present and take note with a pen and paper – this might be useful for you later on. Practice respectful listening and dialogue. Occasionally, I might randomly cold call you during the class session.

Some modules, every now and then, will include a short quiz to evaluate your comprehension of the material. These assignments will be a combination of multiple choice, true/false, and short questions. Some will include a short reflective essay as a response to the concepts and how it relates to your experience. I encourage you to use the assignments as an opportunity to evaluate your own understanding of the course material.

In particular, the individual assignments will be evaluated based on your basic writing skills, demonstration of understanding the fundamental concepts, the logic and strength of the arguments you show, and how well your work contributes to offering a broad and holistic perspective for the class.³

Please bear in mind that all information used in the analysis must be publicly available and properly referenced. Be clear in referencing your data sources using footnotes or end-notes. You may cite web addresses or other public domain information, but please ensure that every sources have been properly referenced.

Group Presentations

This project is designed to provide an avenue for you to understand and to apply general course concepts to a specific case of digital technologies and innovation. You will be divided into several groups and each group should prepare the presentation for the scheduled sessions. This project allows you to activate and demonstrate your understanding of the course concepts in creative and (hopefully) meaningful ways.

I strongly encourage you to bring up the knowledge you are gaining about your topic as it relates to our class discussions. Please understand that there is a (small) duration/limit to these exercises – normally, no more than 30 minutes. This is intentionally designed to be an exercise in synthesizing the **most** important information. This would reflect a myriad of jobs in the realm of digital innovation and technology management in which you the expert would be expected to do so. Make every word/minute/second count.

Research materials should include academic journals/research papers, magazine and newspaper articles, personal interviews, web surfing, and personal experiences. Bear in mind that all information used in the analysis must be publicly available and properly referenced. Be clear in referencing your data sources using footnotes or end-notes. Please cite all resources appropriately. Use this opportunity to express your hopes, ideas, criticism, and concerns about technology and digital innovation as it relates to you and your chosen subject. Do not be shy in presenting your findings and analysis.

Each of you comes to this course with different skills of presentation and public speaking, and this is acceptable. Use this opportunity to develop and enhance your skill over the semester. To ensure fairness to all of your classmates, please state clearly which part is your own work, which part is helped by others, and which part comes from the available templates.

While you are expected to work collaboratively on each week's group presentation, it is unacceptable to divide up the assignment, e.g., Adam opens up the presentation, Brenda answers question 1, Chiara answers question 2, and Dino puts the parts together. We need each person to demonstrate understanding

³Me and my colleague, Rocky Adiguna, made an attempt to help students improve their academic writing. Please download our manual at <http://s.id/bantu-nulis>.

of all of the learning objectives and to learn from each other. Each person should arrive at the team meeting having read all the materials and having developed some ideas for the presentation. This is the professional way to undertake team projects at work.

Group 1

- Aisyah Khuriyyatu Wirda
- Mumtaz Humam Alfian Zulva
- Dewa Anggar Pratama
- Irfan Septia Dwisantana
- Jundi Al Fikri
- Sri Utami
- Arya Yudhistira

Group 2

- Farrel Ryandanendra Putra
- Gulnar Isfandiary
- Ikhsan Daffa Pradnya Ivandra
- Genoveva Jenny Ruth
- Muzayyanah Az Zahra Qurratu'ain
- Muhammad Aulia Fikri Akbar

Group 3

- Rangga Prasetya Nugraha
- Iqbal Farid Ma'ruf
- Josuanstya Lovdianchel
- Mutia Raihan Iftinany
- Salsabila Qatrunnisa Balqis
- Elfina Br. Tamba

Group 4

- Zaidan Naufal Grajanara
- Sahadya Syahida Rahma
- Ratis Maharani Dewi Cesarina
- Shorim Haniffanshoib
- Sindy Puspitasari
- Ikhwandaru Mandegani

Group 5

- Ibriza Zuhkruf Fajrya Santos Ahmad
- Anggara Dwy Haryadi
- Muhammad Syauqy Noer Yuda
- Vincentius Candra Kurniawan Laiyan
- Amanda Inkuta Ramadhania
- Aylla Indrarani Ramadhanti

Group 6

- Satria Dewa Sagita
- Rizki Zhafir Haffiyan
- Fairus Akbar
- Milzam Shidqi Ismanta
- Cyntia Nur Azizah
- Alice Sayyida Safaruddin

Group 7

- Aisyah Amalia Efendi
- Anindya Putri Fatikha Sani
- Naurah Batrisyia Handoyo
- Tyrza Almeira Laloan
- Maura Dike Valentin
- Intifada Al-Faruq

Group 8

- Mohamad Sultan Rayhan Arivano
- Wigar Aqil Samboga Anom
- Firdausi Adiwijaya
- Fa'iz Hibatullah Sutardi
- Salsabila Nurul Janah
- Sylvia Tellanisdar Gulo

Group 9

- A Yazid Bustommy
- Putri Wulandari
- Nanda Aurelia Widodo
- Krisna Rahmantio
- Nikodemus Hanwey Karyadi
- Hanifa Putri Anjli
- Ikhsan Hidayat

Group 10

- Naufal Fadhil Syafri
- Raden Roro Nurhaliza Prameswari Utami
- Nadifa Silvia Maharani
- Safira Aryandini
- Muhammad Atha Ghatfan
- Yulia Dwi Kustari

Group 11

- Annaz Fiirizky Putra Darmawan
- Imam Yudha Dewantara
- Elisa Lintang Ratri Arianna
- Ghina Tsabitah
- Annisa Aulia Adenna

- Afdil Kholid
- Gregorius Bintang Kusuma Indriyatno

Group 12

- Rio Agustino Handoyo
- Delpina Theresia Simanjuntak
- Amanda Putri Ayuningtyas
- Annisa Nurkamila Dewi
- Christian Dwi Cahya Saputra
- Cynthia Dellanova Widyastuti

Written Exams

The midterm exam will be covering the Session 1 to Session 7, including readings, discussions, and lectures. The final exam will be comprehensive, covering the Session 8 to Session 14, including readings, discussions, and lectures. Areas of emphasis on the exam will have been discussed in class during the course of the semester. The structure of the exam will be short answer/essay and analysis of case-based situations.

Exams (and quizzes, if any) are typically closed books and closed notes. No makeup quizzes or exams will be given. You should **not** collaborate with other students during the exam period. However, you may consult any of your course materials. The exams will be timed and require critical thinking, so bear in mind that it will be helpful if you know the material yourself and do not fully rely on looking up each answer.

Your exams, both the midterm exam and final exam, will be graded according to the following criteria.⁴

1. **Content/Development - 15%.** Your answer addresses each question and all its parts thoroughly; incorporates relevant course content into responses; uses specific information from the case in response.
 - **7-10:** Your answer has a specific central idea, clearly stated, appropriate, and show originality and focus.
 - **4-6:** Your central idea is rather vague, somewhat sketchy, and does not clearly support the topic. It also lacks focus.
 - **2-3:** You are unable to find particular supporting details and suffer from several errors in the information.
 - **0-1:** Your answer has no central idea or supporting details.
2. **Understanding/Application - 30%.** Your answer demonstrates a deep understanding of course theories and ideas applied to the analysis of case situations.

⁴The following rubric measurements will also be used to examine your written assignments.

- **7-10:** Your answer is logically organized, well-structured, and displays evidence of critical thinking skills.
 - **4-6:** Your answer has somewhat digressed from the central idea and theory. Your ideas also do not logically follow each other.
 - **2-3:** You lost your central point and flow of the essay. It lacks organization and continuity.
 - **0-1:** You are unable to organize ideas and theories. There is no particular flow.
3. **Original Thinking - 25%.** Demonstrates original thinking that adds insight to the analysis of the case, meaningful elaboration beyond the text, notes, class discussion in strategy development.
- **7-10:** You cite researched information carefully. You also introduce personal ideas to enhance the cohesiveness of your answer.
 - **4-6:** You include several ideas but were inconclusive to support the answer. Some cited information was vague.
 - **2-3:** You did the little or limited gathering of information on the topic. Cited information was vague.
 - **0-1:** There is no important literature cited in your answer.
4. **Style and Structure - 15%.** Response to each question is well organized and clearly written; there is evidence of planning before writing.
- **7-10:** Your writing is smooth, coherent, and consistent with the central idea. Sentences are strong and expressive with varied structure. Diction is consistent, and words well were chosen.
 - **4-6:** Sentences are varied and inconsistent with central idea/theory, vocabulary, and word choices.
 - **2-3:** Your answer lacks creativity and focus. You use unrelated word choice to central idea/theory. Diction is also inconsistent.
 - **0-1:** Your writing is confusing and hard to follow. It contains fragments and/or run-on sentences. You use inappropriate diction.
5. **Grammar and Mechanics - 15%.** The response is virtually free of mechanical, grammatical writing errors.
- **7-10:** Your answer has no errors in word selection and uses, sentence structure, spelling, punctuation, and capitalization.
 - **4-6:** Your answer is relatively free of errors in word selection and use, sentence structure, spelling, punctuation, and capitalization (1-3 errors).
 - **2-3:** Your answer has several errors in word selection and use, sentence structure, spelling, punctuation, and capitalization (4-6 errors).
 - **0-1:** Your answer has serious and persistent errors in word selection and use, sentence structure, spelling, punctuation, and capitalization (7 errors or more).

Tutorial: Introduction to Python

What is Python?

Python is an interpreted, high-level, general-purpose programming language. It is great as a first language because it is concise and easy to read. We can use it for everything from web development to software development and scientific applications. This session covers the basic function of Python and how to perform simple programming using PyCharm. You should bring your own laptop, be it Windows, Mac, or Linux, and practice using Python in the classroom.

Many students and faculty members in business and management field have probably been exposed to SPSS for data analysis or SmartPLS for structural equation modeling, where the user relies on a series of window-based options to 'point-and-click' to select and run their analyses. However, in addition to the point-and-click method, users can alternatively rely on scripting, where they write out commands based on the rules of the program. This can be a little intimidating for anyone who do not have any experience with scripting or coding.⁵

From my perspective, you need to learn some basics about how the program works, some foundational rules, and what it is capable of. From there, you are best off working on actual problems and figuring out what you need to as you go. Over time, some of those lessons will sink in, you will consolidate your knowledge, and then you will take it further. Some people call this learning. Indeed, you cannot just suddenly program in Python. You have to learn how, and learning takes time.⁶ A lot of time.⁷ And Google.

Installing Python

For all lessons you will obviously use Python and for most of them you will use PyCharm. You have no idea what those mean, fine, but you soon will, and I wanted to mention it here for those who have heard of them. As mentioned, Python is open source and freely available, so does not require any purchases on your part. Python is also available on many different platforms, including Microsoft Windows, Apple OSX, Linux, *BSD, among others.

Installing both Python and PyCharm is easy peasy lemon squeezy. Go to the website, download it, and install it. The instruction is very straightforward and I assume that you would not find it difficult to do so. You may be wondering how long all of this will take. That, like most things, depends. You could certainly work through all of this in about 5 minutes of concentrated effort.

As you will see, this tutorial assumes you know absolutely nothing at all about Python or coding. Like seriously nothing; you will see. You should be able to complete all of the lessons in a couple hours of work. Once you do, you will have learned the basic landscape of Python and PyCharm, how to read in data, manipulate data, import data from external sources, and do basic analyses. You will not learn much, but you will know more than you did before.

The instructional video is available at <https://youtu.be/rmZkAnWGQtE> (1:14:57) and I strongly encourage you to give it a try as early as possible. Your programming exercise will be measured according to the overall performance of your script/code and the creativity of your proposed solution.

⁵Nevertheless, we all have to confront intimidating activities at some point, then why worry? Now, sit back, relax, and enjoy the flight. Thank you.

⁶It takes nine months to have a baby. Warren Buffett famously said, "You can't produce a baby in one month by getting nine women pregnant."

⁷The Quran, which have nearly 600 pages, was orally revealed by God to the prophet Muhammad through the archangel Jibril incrementally over a period of some 23 years – beginning in the month of Ramadan, when Muhammad was 40, and concluding in 632, the year of his death.

6 Course Protocols

Teaching Methods

This course is delivered a mixture of seminars, discussions, and tutorials. Students must prepare and present a short review before class sessions begin. The summary of the main ideas for each session will be part of the course assignment. The instructor will then lead the discussion and explain some core concepts related to the topic. Every week, students will work together in groups to present the reading materials and their analysis. The philosophy behind this method is that students should be doing, rather than having the instructor do it for them.

This class is intended to encourage you to **think hard about the things** that make innovation and information management so complex, contradictory, confusing, and often dysfunctional. Thus, it is crucial that you read the assigned materials slowly and attentively prior to each class.⁸ A massive amount of learning in this course may happens in real-time, during class. Come ready to participate and work. Long lectures will be rare occurrences in this class, so you should be prepared to be active throughout the class. Our online classroom can be accessed at:

<https://ugm-id.zoom.us/j/99308169934?pwd=S1o4dmI5ekRSQ1pRcjMyM3hUWC91dz09>
Meeting ID: 993 0816 9934
Passcode: geewonii

During the pandemic, however, we realized that teaching on Zoom or Webex is hard.⁹ Learning is also hard online.¹⁰ This becomes a potential vicious circle all around. Thus, some of this course will be offered **asynchronously**. This means that all work for the course can be completed at a time and place of your choosing. All course materials and assignments will be posted on and accessible. There will be normally one module to complete each week. Each module will include reading and listening materials, video lectures, engagement activities, and assignments.

The major part of our learning is based on the students' engagement in the provided learning activities, including their own assignments, individual or in groups. Learning activities and assignments are designed to improve students' generic skills, specifically oral and written communication, presentation techniques, information searches, and teamwork. Do not get behind in the reading and exercises. The current topics of innovation and information management will be discussed in class will be harder to follow if students have not done the assigned reading. The best way to stay up is to block out the exact same study times for this course each week, then stick to them.¹¹

Learning Materials

Each module includes reading and/or listening materials. These materials include a mix of videos, podcast episodes, news articles, and/or academic journal articles.¹² I have chosen these materials to illustrate

⁸If you are having difficulty in the course, you should contact me or go to office hours and ask questions. You will be surprised how often this helps.

⁹See, for example, "Faculty members struggle with burnout," *Inside Higher Ed*, September 14, 2020, available at <https://www.insidehighered.com/news/2020/09/14/faculty-members-struggle-burnout>.

¹⁰"Is Learning on Zoom the Same as In Person? Not to Your Brain," *EdSurge*, September 15, 2020, available at <https://www.edsurge.com/news/2020-09-15-is-learning-on-zoom-the-same-as-in-person-not-to-your-brain>

¹¹Write a short summary of every session. What was the most interesting or important technical idea or concept that you gained from the assigned readings? Why do you consider it the most interesting or important? Identify the relevant ideas in your notes.

¹²If you are finding it difficult to access some reading materials or journal articles, please do let me know.

key concepts that I will be discussing during the synchronous session. Some of these materials may also inform the engagement activities you will be asked to complete as part of each module.

Please **do all of the readings before class** and take some time to think about them. For each session, the syllabus provides a set of reflective questions for you to think about. Part of being prepared is having answers for these questions. Take at least 30 minutes to write answers to these questions in your notes and bring those to the class. These written answers will not be collected or graded, but having them available during the session does help.

Technological innovation is ever-evolving indeed. I may update those materials accordingly throughout the semester as needed. In any case, keep in mind the time of writing as you place the readings in context. I recommend keeping up with current events on a regular basis as you are able. For innovation in general, some good English sources to start with are the CIO magazine, the MIT Technology Review, and the Wired magazine. Some general sources such as the Guardian and the Economist has a particular column on technology and innovation.

If you see an interesting article that relates to our course material, or you may have a question about, please feel free to email it to me so that we can discuss it.

Attendance and Absences

Attendance is expected and will be taken in each class. Absences deprive your classmates of the opportunity to learn from your unique insights and experiences. Due to the university regulation, you are expected to attend all course sessions. Absences will be excused only in the case of an emergency (*force majeure*). More than 25% of unexcused absences may prohibit students from enrolling in the final exam. Students are responsible for all missed work, regardless of the reason for absence. It is also the absentee's responsibility to get all missing notes or materials. A student who incurs an excessive number of absences may be withdrawn from a class at the discretion of the instructor.

Laptops and Mobile Phones

The use of phones is **not** permitted in the physical classroom. You may use laptops in the classroom only when you are instructed to do so. Indeed, if you require the use of technology for any reason, please let me know right away so that we can make arrangements.

Instant messaging, gaming, emailing, surfing the web, and working for other course assignments, are distractions to the student, the surrounding students, as well as the instructor, and constitute inappropriate behavior. Students are ethically obliged to avoid these and similar practices. If a student misuses a computer (including laptop, netbook, tablet, or mobile phone), it will lower his/her final grade by 10 percent off for each incident.

Rules of Online Engagement

As class participation is integral to the flow of discussion, every student attending online from home is expected to keep their videos on at all times, behave like they were in a physical classroom, and actively participate to the session.

Please ensure that you have a secure and stable internet connection. Use the best quality hardware available to you. Use a large monitor if possible to enable you to view the whole class. Do not use a mobile phone. Also, make sure that you have a good sound quality for your headset and microphone.¹³

¹³A headset is preferred rather than a speaker in order to avoid unnecessary echo, feedback, and unwanted noise.

Make sure you have a webcam whose resolution can be supported by your internet speed. Lastly, make sure your full name is displayed on your video image.

During class, please keep your video on and your microphone off. I will be observing your reactions and encouraging the flow of discussion by watching how you are responding to the material and cold calling you as needed. It might take you time to get the balance 'right' between listening silently, participating actively, and interrupting confusingly. If you want to speak, use the 'hands up' Zoom button and I will acknowledge you. Indeed, online lessons require a different pacing and deeper concentration than offline classes. Keep it in mind.

Communications and Availability

I strive to make myself available to students, give prompt feedback, and accommodate all my students' abilities and needs. I am here for you, so please do not hesitate to reach out with any questions, concerns, or suggestions. The best way to reach me is by email. I will make every effort to answer emails within 24 hours or less. Email me again if, in rather rare cases, you have not got a reply within 72 hours.

If you email me, your emails should be carefully crafted and look like good business communication. Be specific about the subject of the email in the mail subject heading and use proper spelling, grammar, and punctuation. Use professional language in all course-related forums. Whenever you send class-related email or messages, please include a clear, specific subject line and use the body of the email or message to explain the purpose for the email and any attached materials. Conduct yourself professionally.

Because of the unusual schedule of the school and other administrative duties, I will be holding office hours by appointment only, usually on Monday at 12.00-14.00. Some students feel uncomfortable requesting a meeting, but please do not hesitate to do so to discuss any aspect of the course. I hope and expect to meet with students regularly. Email me and let me know a few times that work for you. During the pandemic, sadly, we can only meet online.

As some of you may begin to apply for jobs, internships, or study abroad, you may need recommendation letters. The more you have cultivated relationships with your instructors, the more they will be able to help you in future endeavors. I can write you a much better recommendation if I know something more than the grades you earned in my class for one semester.

Assignments and Authorship

Students are expected to work independently. Offering and accepting solutions from others is an act of **plagiarism**, which is a serious offense, and **all involved parties will be penalized**. Discussion amongst students is encouraged, but when in doubt, direct your questions to the instructor. **No late assignments** will be accepted under any circumstances.¹⁴

The student's work must match the instructor's intended purpose for an assignment. While the instructor will establish the intent of an assignment, each student must clarify outstanding questions of that intent for a given assignment. The student may not give or get any unauthorized or excessive assistance in the preparation of any work. Any attempt to deceive a faculty member or to help another student to do so will be considered a violation of this standard.

The student must clearly establish the authorship of a work. Referenced work must be clearly documented, cited, and attributed, regardless of media or distribution. Even in the case of work licensed

¹⁴Especially during the pandemic, I understand that circumstances in your life may sometimes affect your ability to meet deadlines. If you foresee an issue with meeting a deadline, please let me know as soon as you can so that we can work out an alternative plan.

as public domain or Copyleft, the student must provide attribution of that work in order to uphold the standards of intent and authorship. If you are working in a group, the roles and contributions of each member of the groups should also be stated.

Online submission of, or placing one's name on an exam, assignment, or any course document is a statement of academic honor that the student has not received or given inappropriate assistance in completing it and that the student has complied with the policy in that work.

Academic Integrity Policy

It is particularly important to the reputation of the Faculty of Economics and Business, Universitas Gadjah Mada (FEB UGM) and of our degrees that everyone associated with our school behaves with the highest academic integrity. As the school that helps develop future leaders, we have a special obligation to ensure that our ethical standards are beyond reproach. Any dishonesty in our academic transactions violates this trust. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation.

Honesty and integrity are integral components of the academic process. Students are expected to be honest and ethical at all times in their pursuit of academic goals in accordance with the FEB UGM Student Code of Conduct. Students are expected to demonstrate academic honesty in all aspects of this course. Academic dishonesty is a serious offense against the school. Violations of this policy may also include, but not limited to, cheating, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. In particular, plagiarism is defined as follows:

Plagiarism is defined as the unacknowledged use of the words, ideas, or creations of another. The principal categories of unacknowledged use are unacknowledged quotation, which is failure to credit quotations of another person's spoken or written words; and unattributed borrowing, which is failure to credit another person's ideas, opinions, theories, graphs, or diagrams. Unattributed borrowing also includes the failure to credit another person's work when paraphrasing from that work. Cosmetic paraphrasing is also plagiarism. This occurs when, even with acknowledgement, the words are so close to the original that what is deemed to have been paraphrased is, in fact a modified quote, but is not presented as such. A more technical form of plagiarism is wrongly attributed borrowing, where one does not acknowledge the work from which one obtained an idea, but quotes, instead, the original source without having read it. This may well convey a broader research effort than that expended and may perpetuate misinterpretation.

You are required to uphold standards of academic honesty and to be familiar with the school's code of conduct and honor code. I will not tolerate plagiarism and will report all suspected cases of academic dishonesty to the academics. I reserve the right to fail any student for the entire course upon demonstration of a violation. If you have any questions about standards of conduct in this course, please let me know.¹⁵

Consequences

An instructor may impose a sanction on the student that varies depending upon the instructor's evaluation of the nature and gravity of the offense. Possible sanctions include but are not limited to, the following:

¹⁵In short, do not cheat. Do not steal. Do not take anything that does not belong to you. Do not be that guy. Yes, you. You know exactly what I am talking about to.

(1) Require the student to redo the assignment; (2) Require the student to complete another assignment; (3) Assign a grade of **zero** to the assignment; (4) Assign a final grade of “**F**” for the course; or (5) Suspension or expulsion from the school for multiple academic dishonesty findings. A student may appeal these decisions to the Study Program. Multiple violations of this policy will result in possible additional sanctions.

Digital Devices

You will need an internet-connected digital device (e.g., a laptop, tablet, or smartphone) to complete the work in this course. I recognize that some students are unable to afford the cost of purchasing digital devices and that other students rely on older, more problem-prone devices that frequently break down or become unusable. I also recognize that those technology problems can be a significant source of stress for students.

If you do not have access to reliable internet or a reliable, internet-connected digital device, I encourage you to contact the Students Office to request assistance. If you contact me, as well, I can also work with you to develop a plan for completing work in this course. If you are experiencing continuous problems with your device or internet access and those problems are persistent and/or interfere with your ability to complete the work for this course, please let me know.

Student Wellness

College life can be quite complicated and challenging, especially during a pandemic. You might feel overwhelmed, experience anxiety or depression, or struggle with relationships or family responsibilities. Student Wellness and Personal Development Center (SWPDC) provides free, confidential support for students who are struggling with mental health and emotional challenges. The SWPDC office is staffed by professional psychologists who are attuned to the needs of all types of students. Please do not hesitate to contact SWPDC for assistance – getting help is a smart and courageous thing to do. **Do not suffer in silence.**

Disabilities Policy

I am committed to creating a course that is inclusive in its design. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with me. If you have a disability, or think you may have a disability, please meet with me so we can develop an implementation plan together and discuss a range of options to removing barriers in this course, including official accommodations. I am happy to consider creative solutions as long as they do not compromise the intent of the assessment or learning activity.

Disclosure

Any and all results of in-class and out-of-class assignments and examinations are data sources for research and may be used in published research or in measuring the assurance of learning (AoL) process. All such use will always be anonymous.

7 Provisional Course Schedule

The weekly coverage might change as it depends on the progress of the class. I will take into account the consideration that this course shall accommodate the learner's pace and learning style. However, you must keep up with the pre-course videos and reading assignments beforehand.¹⁶ The recorded lectures from the previous semesters can also be seen at <https://youtube.com/playlist?list=PL8ePb5ABvPraWEVpNHn1BybE8ROTgKR2m> and <https://youtube.com/playlist?list=PL8ePb5ABvPrYX0dXT7yFQJ1PTnf01wnG1>.

Session 1: Introduction to the Course

Session 1 serves as the gateway to our exploration of the crucial facets of this course. This kick-off session is designed to ground you in the core principles and ideas that will be integral to our study in this journey. We begin by acquainting you with the multidimensional nature of managing information and technological innovation, a task that is becoming increasingly central to all organizations in today's digital age. This session sets the stage, laying the foundation for more in-depth exploration and discussion in the later parts of the course.

The session's central aim is to help you grasp the complexities and nuances associated with establishing and nurturing digital innovation within an organization. Innovation, particularly in the digital realm, is a potent catalyst for growth and competitive advantage. However, harnessing its potential requires a deep understanding of the interplay between technology, strategy, and organizational factors. By the end of this introductory session, we aim to equip you with a robust initial understanding of these dynamics, setting the stage for a deeper dive in the subsequent course sessions.

- Measurements and indicators: CO1, LI1
- Pre-class activities:
 - Video lecture: Introduction to the Course
<https://youtu.be/wQ-9gluDR9Y> (3:10)
- In-class activities (February 24, 2023):
 - Synchronous session: Introductory and course logistics
- Post-class activities:
 - Assignment: Tell us a little more about yourself. Provide short description of who you are and why you are here. What do you want and/or need to get out of it? What are you anxious about? What are you excited about? Share your thoughts below by adding additional bullet points. What are your expectations to the subjects, your fellow classmates, and instructor? Share your thoughts via email at sumberkebahagianmu@gmail.com.
- Reflective questions:

¹⁶Reading materials with the asterisk (*) are mandatory for the session. Most of the UGM Library's online resources can be accessed from anywhere via an internet connection. When off campus, you will need to use Virtual Private Network (VPN) to authenticate with your UGM Computing ID and password to get access to journal articles, databases, and other online resources. See <https://dssdi.ugm.ac.id/rilis-berita/penggunaan-vpn-untuk-pembelajaran-daring.html> for further instruction.

- What is reflection? What is a reflective discussion?
- Why is reflection an important capability for a leader?
- Why have you selected to take this class?
- What you hope to learn and what questions do you have about the syllabus?
- What intentions do you have for the class?
- What intentions might you develop for how you hope to change as a result of the class?

Session 2: Revisiting the Digital Economy

We will revisit the intricacies of the digital economy, a burgeoning paradigm that's shaping the future of industries and societies alike. At the heart of the digital economy is digitalization, the integration of information technology into every facet of our daily lives. This profound integration extends far beyond mere technology adoption; it heralds the in-depth networking of all sectors within an economy and necessitates that all actors adapt to the realities of a digitized economic environment. This permeating digitalization influences everything from our communication habits to our shopping preferences, transforming traditional ways of doing business and propelling the rise of new business models.

However, this transition into a digital economy isn't without challenges. As organizations strive to leverage digital technologies, they find that traditional methodologies and concepts often fall short. The digital economy entails a shift from routine tasks to more complex, non-routine activities, which call for novel strategies and approaches. These complexities highlight the need for a deep understanding of the digital landscape and its potential impacts on different organizational functions, ranging from operations and marketing to human resources and strategic planning.

In this session, we aim to debunk common misconceptions and illuminate the 'half-truths' that often cloud our understanding of the digital economy. By doing so, we hope to provide a clearer and more nuanced picture of the opportunities and challenges presented by the digital economy. As we traverse the digital economy landscape, we will uncover the truths behind popular myths, and delve into real-world case studies to illustrate the power and potential of embracing digital transformation.

- Measurements and indicators: CO1, CO3, LI1, LI2
- Pre-class activities:
 - Video lecture: Contextual ambidexterity
<https://youtu.be/6XmfYR7VSRg> (6:26)
 - Reading
 - * Miao, Z. (2021). Digital economy value chain: concept, model structure, and mechanism. *Applied Economics*, 53(37), 4342-4357. <https://doi.org/10.1080/00036846.2021.1899121>.*
 - * Williams, L. D. (2021). Concepts of Digital Economy and Industry 4.0 in Intelligent and information systems. *International Journal of Intelligent Networks*, 2, 122-129. <https://doi.org/10.1016/j.ijin.2021.09.002>.*
 - * Dahlman, C., Mealy, S., & Wermelinger, M. (2016). Harnessing the digital economy for developing countries. *OECD Development Centre Working Papers*, No. 334, OECD Publishing, Paris. https://oecd-ilibrary.org/development/harnessing-the-digital-economy-for-developing-countries_4adffb24-en or <https://doi.org/10.1787/4adffb24-en>.

- * Brynjolfsson, E., & Kahin, B. (Eds.). (2002). *Understanding the Digital Economy: Data, Tools, and Research*. MIT Press. <http://196.43.179.6:8080/xmlui/bitstream/handle/123456789/431/Understanding-%20the-%20digital-%20economy%20-%20data-tools-%20and-%20research.pdf>.
- * Tarakanov, V. V., Inshakova, A. O., & Dolinskaya, V. V. (2019). Information Society, Digital Economy and Law. *Studies in Computational Intelligence*, 3-15. https://doi.org/10.1007/978-3-030-13397-9_1.
- * Barefoot, K., Curtis, D., Jolliff, W., Nicholson, J. R., & Omohundro, R. (2018). Defining and Measuring the Digital Economy. *US Department of Commerce, Bureau of Economic Analysis*. Washington DC, 3/15/2018. <https://www.bea.gov/sites/default/files/papers/defining-and-measuring-the-digital-economy.pdf>.
- * Bukht, R., & Heeks, R. (2017). Defining, conceptualising and measuring the digital economy. *Development Informatics working paper*, (68). http://hummedia.manchester.ac.uk/institutes/gdi/publications/workingpapers/di/di_wp68.pdf.
- * Brynjolfsson, E., & Collis, A. (2019). How should we measure the digital economy. *Harvard Business Review*, 97(6), 140-148. <http://hbr.org/2019/11/how-should-we-measure-the-digital-economy> or <http://digamoo.free.fr/hbr1119.pdf>.
- * Pan, W., Xie, T., Wang, Z., & Ma, L. (2022). Digital economy: An innovation driver for total factor productivity. *Journal of Business Research*, 139, 303-311. <https://doi.org/10.1016/j.jbusres.2021.09.061>.
- * Watanabe, C., Naveed, K., Tou, Y., & Neittaanmäki, P. (2018). Measuring GDP in the digital economy: Increasing dependence on uncaptured GDP. *Technological Forecasting and Social Change*, 137, 226-240. <https://doi.org/10.1016/j.techfore.2018.07.053>.
- * Iman, N. (2016). Distorsi Ekonomi Digital, *Harian Jawa Pos*, August 2, 2016, 4. Available at <http://nofieiman.com/wp-content/images/paper-distorsi-ekonomi-digital.pdf>.
- * Iman, N. (2016). Implementasi Ekonomi Digital, *Harian Republika*, August 13, 2016. Available at <http://www.republika.co.id/berita/koran/opini-koran/16/08/13/obubo81-implementasi-ekonomi-digital> or <http://nofieiman.com/wp-content/images/paper-implementasi-ekonomi-digital.pdf>.

- In-class activities (March 6, 2023):

- Group presentation #1: Revisiting the Digital Economy
- Discussant: Group #3 and Group #7
- Synchronous session: Seminar and discussion

- Post-class activities:

- Video tutorial: Introduction to Python
<https://youtu.be/rmZkAnWGQtE> (1:14:57)
- Assignment: Install Python on your computer/laptop. Write a simple script and upload your screenshot, screen capture, or selfie showing your installed screen or your workspace. Email me at sumberkebahagiaanmu@gmail.com.

- Alternatively, instead of installing PyCharm on your own, you may also use Google Colab, a free Jupyter notebook that allows to run Python in the browser without the need for complex configuration. It comes with Python installed and has all the main Python libraries installed. It also comes integrated with free GPUs. Go to <https://colab.research.google.com>, create a new file by choosing File > New > New Python 3 notebook.

- Reflective questions:

- What is digital economy?
- What are the core of the digital economy?
- What makes it different than the 'old' economy?
- How does it affect the way in which we conduct a business?

Session 3: The Nature of Digital Innovation

Session 3 offers an in-depth exploration into the intriguing domain of digital innovation. The nature of digital innovation extends beyond simple application of technology—it is an intertwining of physical and digital materiality that drives transformative change in market offerings, business processes, or models. Innovations in the digital space have an immense capability to radically reshape industries and redefine competitive boundaries. The ubiquitous nature of digital technology has not only enabled new products and services but has also fundamentally changed the way businesses operate and interact with their customers.

A wide range of digital tools and infrastructure underpin this evolution, from 3D printing to data analytics and mobile computing. These technologies, each in their unique ways, have opened up new possibilities for innovation. For example, 3D printing is revolutionizing manufacturing, making it possible to create complex designs more efficiently. Meanwhile, data analytics is allowing companies to gain insights into their customer's behaviors and preferences like never before, enabling the personalization of products and services. Mobile computing, on the other hand, has made services accessible to users on the go, leading to the development of entirely new business models in sectors like transportation and food delivery.

Managing digital innovation requires a deep understanding of these technological capabilities and how they can be leveraged to drive business value. The session will delve into this management aspect, discussing the fundamental principles of managing information and digital innovation. Furthermore, we'll introduce a basic framework for managing digital transformation, outlining how such initiatives can be guided and executed to optimize organizational performance and competitiveness. The impacts of digital transformation can be far-reaching, with potential benefits including improved customer experience, increased operational efficiency, and the development of new revenue streams. Understanding these impacts is vital for businesses looking to survive and thrive in the digital age.

- Measurements and indicators: CO1, CO3, LI1, LI2

- Pre-class activities:

- Video lecture: Fundamental aspects of digital innovation (1)
<https://youtu.be/e7BpAg3rTlQ> (12:36)
- Video lecture: Fundamental aspects of digital innovation (2)
<https://youtu.be/3vYr7-tjQRo> (17:29)

– Reading:

- * Yoo, Y., Boland, R. J., Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization Science*, 23(5), 1213-1522. <http://dx.doi.org/10.25300/MISQ/2017/41:1.03>.*
- * Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *MIS Quarterly*, 41(1), 223-238. <https://doi.org/10.1287/orsc.1120.0771>.*
- * Ciriello, R. F., Richter, A., & Schwabe, G. (2018). Digital innovation. *Business & Information Systems Engineering*, 60(6), 563-569. <https://doi.org/10.1007/s12599-018-0559-8>.
- * Kohli, R., & Melville, N. P. (2019). Digital innovation: A review and synthesis. *Information Systems Journal*, 29(1), 200-223. <https://doi.org/10.1111/isj.12193>.
- * Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, 28(1), 52-61. <https://doi.org/10.1016/j.infoandorg.2018.02.004>.
- * Nylén, D., & Holmström, J. (2015). Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation. *Business Horizons*, 58(1), 57-67. <https://doi.org/10.1016/j.bushor.2014.09.001>.
- * Demirkan, H., Spohrer, J. C., & Welsch, J. J. (2016). Digital innovation and strategic transformation. *IT Professional*, 18(6), 14-18. <https://doi.org/10.1016/j.infoandorg.2018.02.004>.
- * Di Vaio, A., Palladino, R., Pezzi, A., & Kalisz, D. E. (2021). The role of digital innovation in knowledge management systems: A systematic literature review. *Journal of Business Research*, 123, 220-231. <https://doi.org/10.1016/j.jbusres.2020.09.042>.
- * Iman, N. (2019). Mewaspadai Inovasi Teknologi, *Harian Kontan*, January 24, 2019. Available at <http://nofieiman.com/wp-content/images/paper-mewaspadai-inovasi-teknologi.pdf>.

● In-class activities (March 10, 2023):

- Group presentation #2: The Nature of Digital Innovation
- Discussant: Group #4 and Group #8
- Synchronous session: Seminar and discussion

● Post-class activities:

- Assignment: TBA

● Reflective questions:

- How would you define digital innovation?
- What are some consequences of digital innovation?
- How does digital innovation affect organizational strategy?
- Does it change the way in which we create value in the digital economy?

Session 4: Standard and Externalities

In this session, we delve into two key concepts that are fundamental to the understanding of innovation and information management - externalities and standards. An externality refers to a cost or benefit that impacts a party who did not choose to incur that cost or benefit. Externalities, which can be either positive or negative, represent a disconnect between individual and societal costs or benefits. In the context of digital innovation, a positive externality could be the widespread adoption of an innovative technology leading to network effects, while a negative externality might be the unintended consequences of a technology, such as privacy concerns or job displacement.

In contrast, standards represent consensus on technical specifications to ensure compatibility and interoperability between disparate products or technologies. Standards can be seen as a kind of language that enables different technologies to work together, facilitating innovation and expanding the scope of possibilities for technology developers. They are crucial for industries where collaboration and integration between various technologies are necessary, and they help to maintain consistency, safety, and quality across products and services. In the realm of digital innovation, standards can play a vital role in enabling the interaction of multiple technologies and systems, thereby accelerating the pace of innovation and increasing its reach.

Both externalities and standards hold significant implications for the management of innovation and information. Network externalities, specifically, play a critical role in the adoption and success of digital technologies. For instance, the value of a social media platform increases as more people join and contribute to the network, creating a positive externality. On the other hand, standards ensure that innovations are compatible and can effectively interact, enabling the smooth integration and operation of complex digital systems. As such, understanding the interplay of standards and externalities is key for organizations seeking to navigate the digital landscape, drive innovation, and manage information effectively.

- Measurements and indicators: CO2, CO3, LI5
- Pre-class activities:
 - Video lecture: Network externalities
<https://youtu.be/GhPLOGbQWQU> (10:53)
 - Video lecture: Standard
<https://youtu.be/0lnT1qIsKQw> (9:26)
 - Reading:
 - * Liebowitz, S. J., & Margolis, S. E. (1994). Network externality: An uncommon tragedy. *Journal of Economic Perspectives*, 8(2), 133-150. <https://doi.org/10.1257/jep.8.2.133>.*
 - * Tirole, J. (2022). Competition and the industrial challenge for the digital age. *IFS Deaton Review on Inequalities*. Institute for Fiscal Studies, March 2022. <https://ifs.org.uk/inequality/wp-content/uploads/2022/03/Competition-and-the-industrial-challenge-IFS-Deaton-Review.pdf>.*
 - * Shapiro, C., & Varian, H. R. (1999). The art of standards wars. *California Management Review*, 41(2), 8-32. <https://journals.sagepub.com/doi/pdf/10.2307/41165984>.
 - * Hoffmann, L. J. (2021). Entitlement problems in digital markets and how antitrust shapes the appropriation of network externalities. *Competition and Regulation in Network Industries*, 22(2), 71-86. <https://doi.org/10.1177%2F17835917211003198>.

- * Windrum, P. (2004). Leveraging technological externalities in complex technologies: Microsoft's exploitation of standards in the browser wars. *Research Policy*, 33(3), 385-394. <https://doi.org/10.1016/j.respol.2003.09.002>.
- * Windrum, P., & Birchenhall, C. (2005). Structural change in the presence of network externalities: a co-evolutionary model of technological successions. *Journal of Evolutionary Economics*, 15(2), 123-148. <https://doi.org/10.1007/s00191-004-0226-8>.
- * Tang, C., Guan, M., & Dou, J. (2021). Understanding the impact of high speed railway on urban innovation performance from the perspective of agglomeration externalities and network externalities. *Technology in Society*, 67, 101760. <https://doi.org/10.1016/j.techsoc.2021.101760>.
- * Wu, J., Li, H., Lin, Z., & Zheng, H. (2017). Competition in wearable device market: the effect of network externality and product compatibility. *Electronic Commerce Research*, 17(3), 335-359. <https://doi.org/10.1007/s10660-016-9227-6>.
- * Parry, M. E., & Kawakami, T. (2017). The encroachment speed of potentially disruptive innovations with indirect network externalities: The case of e-readers. *Journal of Product Innovation Management*, 34(2), 141-158. <https://doi.org/10.1111/jpim.12333>.
- * Qasim, H., & Abu-Shanab, E. (2016). Drivers of mobile payment acceptance: The impact of network externalities. *Information Systems Frontiers*, 18(5), 1021-1034. <https://doi.org/10.1007/s10796-015-9598-6>.
- * Ewe, S. Y., Yap, S. F., & Lee, C. K. C. (2015). Network externalities and the perception of innovation characteristics: mobile banking. *Marketing Intelligence & Planning*, (33)4, 592-611. <https://doi.org/10.1108/MIP-01-2014-0006>.

- In-class activities (March 13, 2023):

- Group presentation #3: Standard and Externalities
- Discussant: Group #5 and Group #9
- Synchronous session: Seminar and discussion

- Reflective questions:

- Why do we have so many different standards?
- How do we define the standard? Is it deliberate or unintended?
- How does digital technology affect externalities?
- What does the concept of standard and externality mean to you?

Session 5: Diffusion of Innovation

Session 5 delves into the fascinating world of innovation diffusion, an exploration of how, why, and at what rate new ideas and technologies permeate society. The rate at which innovation diffuses can differ significantly across domains; some innovations may quickly achieve virality and widespread adoption, while others may never reach their potential tipping point. The dispersion of an innovation, whether it's a new product, service, or process, isn't purely happenstance; it follows a pattern and is influenced by a multitude of factors ranging from the intrinsic characteristics of the innovation itself to the social, cultural, and economic context in which it is introduced.

At the heart of innovation diffusion is the concept of adoption. Adoption refers to the process by which an individual, organization, or society as a whole begins to utilize a new idea, product, or process. The rate of adoption is crucial because it indicates how quickly a population is embracing an innovation. Understanding this adoption process is integral for organizations looking to ensure their innovations successfully penetrate the market. This session will delve into the variables that affect this adoption rate, such as perceived usefulness, ease of use, and the social influence surrounding the innovation.

Central to the discussion of innovation diffusion is the concept of critical mass, the point at which an innovation's diffusion becomes self-sustaining. Beyond the critical mass point, adoption of the innovation continues to grow, not due to the efforts of the initial innovators, but because of the momentum built up through the diffusion process. This tipping point is of paramount importance to organizations seeking to launch new innovations, as reaching this point can be the key determinant of an innovation's success or failure. By developing a deep understanding of the principles and dynamics of innovation diffusion, organizations can more effectively strategize, launch, and manage their innovations for maximum impact and value creation.

- Measurements and indicators: CO2, CO3, LI4
- Pre-class activities:
 - Video lecture: Diffusion of innovation
<https://youtu.be/Xh475nppLf0> (10:57)
 - Reading:
 - * Rogers, E. (1995). *Diffusion of Innovations*. New York, The Free Press. (Read especially Chapter 1). <https://teddykw2.files.wordpress.com/2012/07/everett-m-rogers-diffusion-of-innovations.pdf>.*
 - * David, P. A. (1985). CLIO and the economics of QWERTY. *American Economic Review*, 75, 332-336. <https://www.jstor.org/stable/1805621>.*
 - * Berry, F. S., & Berry, W. D. (2018). Innovation and diffusion models in policy research. *Theories of the Policy Process*, 253-297. <http://edwardwimberley.com/courses/IntroEnvPol/theorypolprocess.pdf>.
 - * Rogers, E. M. (2002). Diffusion of preventive innovations. *Addictive Behaviors*, 27(6), 989-993. [https://doi.org/10.1016/S0306-4603\(02\)00300-3](https://doi.org/10.1016/S0306-4603(02)00300-3).
 - * Reinganum, J. F. (1989). The timing of innovation: Research, development, and diffusion. *Handbook of Industrial Organization*, 1, 849-908. [https://www.edegan.com/pdfs/Reinganum%20\(1989\)%20-%20Chapter%2014%20The%20Timing%20of%20Innovation%20Research%20Development%20And%20Diffusion.pdf](https://www.edegan.com/pdfs/Reinganum%20(1989)%20-%20Chapter%2014%20The%20Timing%20of%20Innovation%20Research%20Development%20And%20Diffusion.pdf).
 - * Utterback, J. M. (1974). Innovation in industry and the diffusion of technology. *Science*, 183(4125), 620-626. <https://doi.org/10.1126/science.183.4125.620>.
 - * Dearing, J. W., & Cox, J. G. (2018). Diffusion of innovations theory, principles, and practice. *Health Affairs*, 37(2), 183-190. <https://doi.org/10.1377/hlthaff.2017.1104>.
 - * Talebian, A., & Mishra, S. (2018). Predicting the adoption of connected autonomous vehicles: A new approach based on the theory of diffusion of innovations. *Transportation Research Part C: Emerging Technologies*, 95, 363-380. <https://doi.org/10.1016/j.trc.2018.06.005>.

- * Soule, S. A. (1999). The diffusion of an unsuccessful innovation. *The Annals of the American Academy of Political and Social Science*, 566(1), 120-131. <https://doi.org/10.1177%2F000271629956600110>.
- * Schmid, J. (2018). The diffusion of military technology. *Defence and Peace Economics*, 29(6), 595-613. <https://doi.org/10.1080/10242694.2017.1292203>.
- * Hall, B. H. (2004). Innovation and diffusion. *NBER Working Paper 10212*. <http://www.nber.org/papers/w10212>.
- * Benhabib, J., Perla, J., & Tonetti, C. (2021). Reconciling models of diffusion and innovation: A theory of the productivity distribution and technology frontier. *Econometrica*, 89(5), 2261-2301. <https://doi.org/10.3982/ECTA15020>.
- * Iman, N. (2016). *Ekonomika Pernikahan dan Ketidaksetaraan*, *Harian Kontan*, October 10, 2016, <http://nofieiman.com/ekonomika-pernikahan-dan-ketidaksetaraan/>.

- In-class activities (March 17, 2023):

- Group presentation #4: Diffusion of Innovations
- Discussant: Group #6 and Group #10
- Synchronous session: Seminar and discussion

- Post-class activities:

- Assignment: TBA

- Reflective questions:

- What does the concept of diffusion mean to you?
- Is the diffusion process more important than the innovation itself?
- What would you consider to be some of the advantages/disadvantages of the diffusion process?
- Are we better off if we develop our own innovation? Or, should we use the existing innovation?
- What factors should we consider before launching our innovation?
- What makes homophily important during the diffusion process?

Session 6: Digital Business Strategy

In Session 6, we will deep dive into the realm of Digital Business Strategy, a pivotal component in today's increasingly digitized business landscape. A digital business strategy is more than just incorporating technology into an organization's processes; it is about leveraging digital resources to create unique value and gain a competitive edge. This strategy permeates through all levels of an organization, informing its direction, goals, and means of achieving them. Whether it involves creating innovative digital products or enhancing existing processes through digitization, the essence of a digital business strategy lies in its ability to transform and elevate business performance through technology.

The centerpiece of a digital business strategy is its focus on harnessing technology to foster business growth and success. By utilizing technologies such as AI, machine learning, data analytics, and more, organizations can reimagine and redefine their product offerings and operational processes. This approach to strategic planning goes beyond mere digitization; it involves fundamentally transforming business

models, activities, competencies, and processes to capitalize on the changes and opportunities presented by digital technologies. The ultimate goal is to increase efficiency, create superior value for customers, and achieve sustainable competitive advantage.

The specifics of a digital business strategy, however, are not set in stone; they depend on the unique circumstances and goals of an organization. The strategy outlines the path an organization will take to cultivate new competitive advantages using technology, and it delineates the tactics the organization will employ to actualize these changes. This may involve strategies such as the development of new digital services, leveraging data for personalized customer experiences, or digitally transforming internal operations for greater efficiency. Throughout this session, we will examine these various aspects of digital business strategy, equipping you with the knowledge to navigate and thrive in the digital business landscape.

- Measurements and indicators: CO1, CO3, LI2
- Pre-class activities:
 - Video lecture: Paradoxes in business/management context
<https://youtu.be/0Rq6cFtsKks> (10:59)
 - Video lecture: New logic of digital innovation
<https://youtu.be/p116P1GTL7I> (11:01)
 - Reading
 - * Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013). Digital business strategy: toward a next generation of insights. *MIS Quarterly*, 37(2), 471-482. <https://www.jstor.org/stable/43825919>.*
 - * Pagani, M. (2013). Digital business strategy and value creation: Framing the dynamic cycle of control points. *MIS Quarterly*, 37(2), 617-632. <https://www.jstor.org/stable/43825925>.*
 - * Teece, D. J. (2018). Profiting from innovation in the digital economy: Enabling technologies, standards, and licensing models in the wireless world. *Research Policy*, 47(8), 1367-1387. <https://doi.org/10.1016/j.respol.2017.01.015>.
 - * Teece, D. J. (2017). Towards a capability theory of (innovating) firms: Implications for management and policy. *Cambridge Journal of Economics*, 41(3), 693-720. <https://doi.org/10.1093/cje/bew063>.
 - * King, D. R., Covin, J. G., & Hegarty, W. H. (2003). Complementary Resources and the Exploitation of Technological Innovations. *Journal of Management*, 29(4), 589-606. [https://doi.org/10.1016/S0149-2063\(03\)00026-6](https://doi.org/10.1016/S0149-2063(03)00026-6).
 - * Tumelero, C., Sbragia, R., Borini, F. M., & Franco, E. C. (2018). The role of networks in technological capability: A technology-based companies perspective. *Journal of Global Entrepreneurship Research*, 8(7), 1-19. <https://doi.org/10.1186/s40497-018-0095-5>.
 - * Alaimo, C., & Kallinikos, J. (2020). Managing by data: Algorithmic categories and organizing. *Organization Studies*, 42(9), 1385-1407. <https://doi.org/10.1177/0170840620934062>.
 - * Amit, R., & Zott, C. (2001) Value creation in e-business. *Strategic Management Journal*, 22(6-7), 493- 520. <https://doi.org/10.1002/smj.187>.

* Mithas, S., Tafti, A., & Mitchell, W. (2013). How a firm's competitive environment and digital strategic posture influence digital business strategy. *MIS Quarterly*, 37(2), 511-536. <https://doi.org/10.25300/MISQ/2013/37.2.09>.

- In-class activities (March 24, 2023):
 - Group presentation #5: Digital Business Strategy
 - Discussant: Group #7 and Group #11
 - Synchronous session: Seminar and discussion
- Post-class activities:
 - Assignment: TBA
- Reflective questions:
 - How are technology and society related?
 - What are the most influential driving forces behind digital innovation?
 - What makes digital innovation different compared to other kind innovations?
 - How has digital innovation change the dynamics of business landscape?

Session 7: Understanding Digital Platform

Session 7 delves into the transformative world of digital platforms, a phenomenon reshaping the contours of virtually every industry in the current era. At their core, digital platforms are multi-sided interfaces that facilitate interactions between various entities such as consumers, producers, and third-party service providers. These platforms, powered by advanced technologies, enable the integration of diverse data, technologies, organizations, and processes to establish novel operating models. They embody a radical departure from traditional business architectures, forging paths that transcend the boundaries of conventional organizational structures, silos, policies, and technological investments.

As digital platforms become increasingly prevalent, we are witnessing the 'platformization' of business models, a trend that is radically reshaping the ways companies operate and deliver value. Platform-based business models are characterized by their focus on facilitating interactions between different user groups rather than on the provision of goods or services per se. They leverage network effects to create value, with each new user adding value to the platform and attracting even more users. This dynamic results in a self-reinforcing cycle that can drive exponential growth, explaining the success of platform giants like Amazon, Uber, and Airbnb.

In this session, we will also delve into the development of the ecosystems that underpin digital platforms and enable organizations to create and capture value. These ecosystems, comprising a diverse range of participants including developers, users, and other stakeholders, are integral to the functioning of digital platforms. They help to foster innovation, enable collaboration, and facilitate the exchange of value. Understanding the mechanics of these ecosystems, and how they interact with and support digital platforms, is critical to navigating the platform economy successfully. Through our exploration of digital platforms, their business models, and supporting ecosystems, we aim to equip you with the insights needed to leverage the power of platforms in today's digital age.

- Measurements and indicators: CO2, CO3, LI6

- Pre-class activities:

- Video lecture: Digital platform

- <https://youtu.be/q1aca1Av2hA> (28:25)

- Reading:

- * Gawer, A., & Cusumano, M. A. (2008). How companies become platform leaders. *MIT Sloan Management Review, Winter 2008*, 68-75. <http://marketing.mitsmr.com/PDF/STR0715-Top-10-Strategy.pdf>.*
 - * Gawer, A. (2021). Digital platforms' boundaries: The interplay of firm scope, platform sides, and digital interfaces. *Long Range Planning, 54(5)*, 102045. <https://doi.org/10.1016/j.lrp.2020.102045>.*
 - * Bonina, C., Koskinen, K., Eaton, B., & Gawer, A. (2021). Digital platforms for development: Foundations and research agenda. *Information Systems Journal, 31(6)*, 869-902. <https://doi.org/10.1111/isj.12326>.
 - * Rietveld, J., & Schilling, M. A. (2021). Platform competition: A systematic and inter-disciplinary review of the literature. *Journal of Management, 47(6)*, 1528-1563. <https://doi.org/10.1177/0149206320969791>.
 - * Parker, G., & Van Alstyne, M. (2018). Innovation, openness, and platform control. *Management Science, 64(7)*, 3015-3032. <https://doi.org/10.1287/mnsc.2017.2757>.
 - * Gawer, A., & Cusumano, M. A. (2014). Industry platforms and ecosystem innovation. *Journal of Product Innovation Management, 31(3)*, 417-433. <https://doi.org/10.1111/jpim.12105>.
 - * Eisenmann, T., Parker, G., & Van Alstyne, M. (2011). Platform envelopment. *Strategic Management Journal, 32(12)*, 1270-1285. <https://doi.org/10.1002/smj.935>.
 - * Schwarz, J. A. (2017). Platform logic: An interdisciplinary approach to the platform-based economy. *Policy & Internet, 9(4)*, 374-394. <https://doi.org/10.1002/poi3.159>.
 - * Nooren, P., van Gorp, N., van Eijk, N., & Fathaigh, R. Ó. (2018). Should we regulate digital platforms? A new framework for evaluating policy options. *Policy & Internet, 10(3)*, 264-301. <https://doi.org/10.1002/poi3.177>.
 - * Kenney, M., & Zysman, J. (2020). The platform economy: restructuring the space of capitalist accumulation. *Cambridge Journal of Regions, Economy and Society, 13(1)*, 55-76. <https://doi.org/10.1093/cjres/rsaa001>.
 - * Fang, T. P., Wu, A., & Clough, D. R. (2021). Platform diffusion at temporary gatherings: Social coordination and ecosystem emergence. *Strategic Management Journal, 42(2)*, 233-272. <https://doi.org/10.1002/smj.3230>.
 - * Kretschmer, T., Leiponen, A., Schilling, M., & Vasudeva, G. (2022). Platform ecosystems as meta-organizations: Implications for platform strategies. *Strategic Management Journal, 43(3)*, 405-424. <https://doi.org/10.1002/smj.3250>.
 - * Hagiu, A. (2014). Strategic decisions for multisided platforms. *MIT Sloan Management Review, 55(2)*, 71-80. <https://sloanreview.mit.edu/article/strategic-decisions-for-multisided-platforms/>.
 - * Jovanovic, M., Sjödin, D., & Parida, V. (2021). Co-evolution of platform architecture, platform services, and platform governance: Expanding the platform value of industrial digital platforms. *Technovation, 118*, 102218. <https://doi.org/10.1016/j.technovation.2020.102218>.

- * Stallkamp, M., & Schotter, A. P. (2021). Platforms without borders? The international strategies of digital platform firms. *Global Strategy Journal*, 11(1), 58-80. <https://doi.org/10.1002/gsj.1336>.
- * Iman, N. (2017). Platform Mengubah Lanskap Bisnis, *Harian Kontan*, December 22, 2017. Available at <https://analisis.kontan.co.id/news/platform-mengubah-lanskap-bisnis>.
- * Iman, N. (2019). Menimbang Regulasi Platform Digital, *Harian Kontan*, July 5, 2019, 11. Available at <http://nofieiman.com/wp-content/images/paper-menimbang-regulasi-platform-digital.pdf>.

- In-class activities (March 31, 2023):
 - Group presentation #6: Understanding Digital Platform
 - Discussant: Group #8 and Group #12
 - Synchronous session: Seminar and discussion
- Post-class activities:
 - Assignment: TBA
- Reflective questions:
 - Why firms tend to develop their own platform?
 - What makes digital platform so popular in the digital economy?
 - What factors determine the number of sided on digital platform?
 - What are strategies to 'core' and 'pipe' the platform?
 - What are the impact of platformization in the industry?

Midterm Exam

Mid-exam covers everything that we discussed in Session 1 to Session 7. This exam tests the students' understanding of the fundamental principles of technology, digital infrastructures, characteristics of innovation, paradoxes in innovation, types of innovation, standard and externalities, as well as diffusion of innovation.

Please keep in mind that this tests are not about memorization. That is a waste of time in a world where we can Google most any fact. Instead, I will be interested in your showing me you understand the fundamental aspects of our materials and the applications of our learning.

Session 8: Types of Innovation

Innovation is the lifeblood of progress, particularly in the realm of technology. Technological innovation, however, is not monolithic; it manifests in myriad forms, each with its distinct characteristics, implications, and challenges. In this session, we aim to deconstruct the various types of technological innovation, enabling a comprehensive understanding of this multifaceted concept. Our exploration will extend to both hard and soft infrastructures, which represent the tangible and intangible assets underpinning technological advancements. Hard infrastructure typically refers to the physical networks necessary

for the functioning of a modern industry, while soft infrastructure involves the institutions which are required to maintain the economic, health, and cultural standards of a country.

Convergence among different media and technologies is another crucial aspect of technological innovation that we will delve into. Technological convergence involves the amalgamation of different technological systems into a unified whole that delivers similar outcomes. This convergence is transforming the way we interact with technology and the world around us, breaking down barriers between different media forms and devices. For example, the smartphone represents a prime example of technological convergence, amalgamating communication, entertainment, productivity, and more into a single device. Understanding this dynamic can enable us to anticipate and capitalize on the opportunities presented by converging technologies.

Finally, we'll examine architectures as the foundational blocks of innovation and information management. Architectures, in this context, refers to the organizational structures and systems that support and enable innovation. They form the blueprint that guides the integration of processes, systems, and information in order to achieve specific goals. By scrutinizing different architectural strategies, we can glean insights into how best to structure and manage innovation within organizations. All in all, by gaining a nuanced understanding of the different types of technological innovation, we will be better equipped to plan for and respond to the ongoing technological revolution.

- Measurements and indicators: CO2, CO3, LI3
- Pre-class activities:
 - Video lecture: Types of innovation
<https://youtu.be/Xyv-C4PzNmc> (22:59)
 - Reading:
 - * Henderson R., & Clark K. (1990). Architectural innovation: The reconfiguration of existing products and the failure of existing firms. *Administrative Science Quarterly*, 35, 9-30. <https://doi.org/10.2307/2393549>.*
 - * Alijani, S., & Wintjes, R. (2017). Interplay of technological and social innovation. *SIMPACT Working Paper Series Vol. 2017 No. 3*. Available at https://www.simpact-project.eu/publications/wp/WP_2017-03_AlijaniWintjes.pdf or https://cris.maastrichtuniversity.nl/ws/portalfiles/portal/122707174/WP_2017_03_AlijaniWintjes.pdf.*
 - * Gallouj, F., Rubalcaba, L., Toivonen, M., & Windrum, P. (2018). Understanding social innovation in services industries. *Industry and Innovation*, 25(6), 551-569. <https://doi.org/10.1080/13662716.2017.1419124>.
 - * Christensen C. (1997). *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Harvard Business School Press. Available at http://lib.yzu.am/open_books/413214.pdf.
 - * Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Digital infrastructures: The missing IS research agenda. *Information Systems Research*, 21(4), 748-759. <https://doi.org/10.1287/isre.1100.0318>.
 - * Henfridsson, O., & Bygstad, B. (2013). The generative mechanisms of digital infrastructure evolution. *MIS Quarterly*, 37(3), 907-931. <https://www.jstor.org/stable/43826006>.

- In-class activities (May 5, 2023):
 - Group presentation #7: Types of Innovation
 - Discussant: Group #1 and Group #9
 - Synchronous session: Seminar and discussion
- Post-class activities:
 - Assignment: TBA
- Reflective questions:
 - What are different types of innovation?
 - What makes architectural innovation special?
 - What does it mean by innovator's dilemma?
 - How does disruptive innovation change the competitive landscape?

Session 9: Financial Technology

Financial technology, commonly known as fintech or FinTech, signifies a paradigm shift in the world of finance. It embodies the wave of technological innovation that is reshaping the landscape of financial services, challenging the status quo, and bringing traditional financial services head-to-head with their tech-driven counterparts. Fintech is not merely a buzzword; it represents a transformative movement in the financial industry, born out of the marriage between technology and finance. From digital payments to robo-advisors, fintech is breathing new life into a sector that has historically been resistant to change.

As an emerging industry, fintech leverages cutting-edge technologies to enhance and streamline financial activities and services. By harnessing the power of innovations like artificial intelligence, blockchain, and data analytics, fintech companies are able to deliver faster, more efficient, and often more affordable financial solutions. These solutions span a variety of areas, including lending, insurance, asset management, and payments, disrupting the traditional models of financial services and democratizing access to finance in ways that were previously unimaginable.

In this session, we will delve into the rise of fintech and examine its impacts on the established world of traditional banking and financial services. The advent of fintech has brought with it a whole new range of capabilities and opportunities, but it has also posed significant challenges for the incumbent financial institutions. Fintech's innovative approach to delivering financial services is forcing traditional banks and financial institutions to reassess their existing models and embrace digital transformation. This shift is not only reshaping the competitive landscape but also redefining the future of finance, an aspect we will explore thoroughly in this session.

- Measurements and indicators: CO3, CO5, LI8
- Pre-class activities:
 - Video recording: Kupas Tuntas Fintech Berbasis Platform
https://youtu.be/w5vtK_9tML4 (27:21)
- Pre-class activities:

– Reading:

- * Iman, N. (2020) The rise and rise of financial technology: The good, the bad, and the verdict. *Cogent Business & Management*, 7(1), 1-17. <http://dx.doi.org/10.1080/23311975.2020.1725309>.*
- * Puschmann, T. (2017). Fintech. *Business & Information Systems Engineering*, 59(1), 69-76. <https://doi.org/10.1007/s12599-017-0464-6>.*
- * Gai, K., Qiu, M., & Sun, X. (2018). A survey on FinTech. *Journal of Network and Computer Applications*, 103, 262-273. <https://doi.org/10.1016/j.jnca.2017.10.011>.
- * Goldstein, I., Jiang, W., & Karolyi, G. A. (2019). To FinTech and beyond. *The Review of Financial Studies*, 32(5), 1647-1661. <https://doi.org/10.1093/rfs/hhz025>.
- * Thakor, A. V. (2020). Fintech and banking: What do we know? *Journal of Financial Intermediation*, 41, 100833. <https://doi.org/10.1016/j.jfi.2019.100833>.
- * Janssen, M., Weerakkody, V., Ismagilova, E., Sivarajah, U., & Irani, Z. (2020). A framework for analysing blockchain technology adoption: Integrating institutional, market and technical factors. *International Journal of Information Management*, 50, 302-309. <https://doi.org/10.1016/j.ijinfomgt.2019.08.012>.
- * Iman, N. (2023). Idiosyncrasies, isomorphic pressures and decoupling in technology platform business. *Journal of Science and Technology Policy Management*, Forthcoming. <https://doi.org/10.1108/JSTPM-12-2021-0190>.
- * Iman, N. (2018). Assessing the dynamics of fintech in Indonesia. *Investment Management and Financial Innovations*, 15(4), 296-303. [http://dx.doi.org/10.21511/imfi.15\(4\).2018.24](http://dx.doi.org/10.21511/imfi.15(4).2018.24).
- * Iman, N. (2018). Is mobile payment still relevant in the fintech era? *Electronic Commerce Research and Applications*, 30(July-August), 72-82. <https://doi.org/10.1016/j.elerap.2018.05.009>.

● In-class activities (May 12, 2023):

- Group presentation #8: Financial Technology
- Discussant: Group #2 and Group #10
- Synchronous session: Seminar and discussion

● Reflective questions:

- What do we know about financial technology?
- How has the financial technology change the banking and financial sectors?
- What are the consequences of such disruption toward the industry and society?

Session 10: Artificial Intelligence and Machine Learning

In Session 10, we delve into the intriguing and rapidly evolving world of Artificial Intelligence (AI) and Machine Learning (ML). AI, at its core, seeks to develop intelligent programs and machines capable of emulating human ingenuity in problem-solving. Traditionally, such creative problem-solving ability has been considered a uniquely human trait. However, AI has begun to blur these lines, enabling machines to mimic and even surpass human intelligence in certain realms. AI's applications extend across a multitude

of domains, from autonomous driving to healthcare, revolutionizing the way we interact with technology and the world around us.

Machine Learning, a subset of AI, elevates these capabilities further by equipping systems with the ability to learn and improve autonomously without explicit programming. This self-learning ability, embedded within systems, enables them to adapt to new inputs, thereby improving their performance over time. A host of ML algorithms, such as neural networks, play a crucial role in facilitating this adaptive learning process. These algorithms, inspired by the workings of the human brain, enable systems to identify patterns and make decisions, translating data into actionable insights.

In this session, we will examine the multifaceted impacts of AI and ML on businesses and industries. We'll explore how these advanced technologies are reshaping operations, driving efficiencies, and facilitating innovation. From automating mundane tasks to enabling data-driven decision making, AI and ML are significantly transforming business landscapes. By gaining a deep understanding of these impacts, professionals can better position themselves and their organizations to leverage these technologies, driving growth and maintaining a competitive edge in an increasingly digitized world.

- Measurements and indicators: CO3, CO5, LI8
- Pre-class activities:
 - Video: Experiment | How to Bring Pin-Ups to Life With Neural Networks
https://youtu.be/gm3Z-_3bjnQ (8:20)
 - Reading:
 - * Duan, Y., Edwards, J. S., & Dwivedi, Y. K. (2019). Artificial intelligence for decision making in the era of Big Data—evolution, challenges and research agenda. *International Journal of Information Management*, 48, 63-71. <https://doi.org/10.1016/j.ijinfo mgt.2019.01.021>.*
 - * Blohm, I., Antretter, T., Sirén, C., Grichnik, D., & Wincent, J. (2022). It's a peoples game, isn't it?! A comparison between the investment returns of business angels and machine learning algorithms. *Entrepreneurship Theory and Practice*, 46(4), 1054-1091. <https://doi.org/10.1177/1042258720945206>.*
 - * Sun, Z., Sun, L., & Strang, K. (2016). Big Data Analytics Services for Enhancing Business Intelligence. *Journal of Computer Information Systems*, 58(2), 162-169. <https://doi.org/10.1080/08874417.2016.1220239>.
 - * Bohanec, M., Borštnar, M. K., & Robnik-Šikonja, M. (2017). Explaining machine learning models in sales predictions. *Expert Systems with Applications*, 71, 416-428. <https://doi.org/10.1016/j.eswa.2016.11.010>.
 - * Bostrom, N. (2019). The vulnerable world hypothesis. *Global Policy*, 10(4), 455-476. <https://doi.org/10.1111/1758-5899.12718>.
 - * Truby, J., & Brown, R. (2021). Human digital thought clones: the Holy Grail of artificial intelligence for big data. *Information & Communications Technology Law*, 30(2), 140-168. <https://doi.org/10.1080/13600834.2020.1850174>.
 - * Yafooz, W. M., Bakar, Z. B. A., Fahad, S. A., & Mithun, A. M. (2020). Business Intelligence Through Big Data Analytics, Data Mining and Machine Learning. In *Data Management, Analytics and Innovation* (pp. 217-230). Springer, Singapore. https://doi.org/10.1007/978-981-13-9364-8_36.

- * Krarup, T., & Horst, M. (2023). European artificial intelligence policy as digital single market making. *Big Data & Society*, 10(1), 20539517231153811. <https://doi.org/10.1177/20539517231153811>.
 - * Armstrong, S., Sandberg, A., & Bostrom, N. (2012). Thinking inside the box: Controlling and using an oracle AI. *Minds and Machines*, 22, 299-324. <https://doi.org/10.1007/s11023-012-9282-2>.
 - * Deepa, N., & Prabadevi, B. (2020). Advanced Machine Learning for Enterprise IoT Modeling. In *Business Intelligence for Enterprise Internet of Things* (pp. 99-121). Springer, Cham. https://doi.org/10.1007/978-3-030-44407-5_5.
 - * Peluang Masa Depan Blockchain, *Harian Kontan*, August 18, 2016. Available at <http://nofieiman.com/wp-content/images/paper-peluang-masa-depan-blockchain.pdf>.
- In-class activities (May 19, 2023):
 - Group presentation #9: Artificial Intelligence and Machine Learning
 - Discussant: Group #3 and Group #11
 - Synchronous session: Seminar and discussion
 - Post-class activities:
 - Assignment: Download and install an image classification model Lobe.ai. Create a project by collecting pictures/images, label them, start training the model, and perform the analysis. Send me a capture or screenshot of your project at sumberkebahagianmu@gmail.com.
 - Reflective questions:
 - How artificial intelligence is transforming our lives and our world?
 - Why artificial intelligence and machine learning so important in business?
 - How does artificial intelligence and machine learning change business operations?
 - How will artificial intelligence and machine learning impact business in the next decade?

Session 11: Data and Surveillance

Data surveillance, once a tool employed primarily by marketers to tailor their advertising strategies, has become an inescapable reality of modern life, growing increasingly invasive as technology continues to advance at an exponential pace. Initially, this surveillance was confined to tracking online behaviors in order to customize marketing messages and offerings, enhancing the relevance of the user experience and boosting the efficiency of targeted marketing campaigns. Through these means, a vast and intricate web of data was woven, profiling individual behavior and preferences and ushering in an era of unprecedented transparency.

As the era of the Internet-of-Things (IoT) dawns, however, the reach of data surveillance extends far beyond our online presence. IoT, powered by the advancements in data storage, transmission, and analysis, extends the realm of surveillance into the physical world, making it more pervasive than ever. Our homes, cars, and mobile devices, are now rife with sensors and data transmission points that track our behavior, habits, and preferences in real-time. Each device, from smart refrigerators to wearables, is constantly gathering, transmitting, and sometimes analyzing data, creating a multi-dimensional, comprehensive profile of our lives.

The evolution of data surveillance does not stop there. Embedded computing is pushing the boundaries of data surveillance even further, breaching the final frontier of privacy – our bodies. Biometric data collection, facilitated by wearables and implanted devices, has added a deeply personal layer to the data being collected. Aspects like heart rate, sleep patterns, and even genetic information are now tracked and stored, representing the most intimate and personal data yet. In this session, we will delve into these aspects of data surveillance, examining the implications of living in a world where the concept of being unobserved is becoming increasingly obsolete.

- Measurements and indicators: CO3, CO5, LI9
- Pre-class activities:
 - Video: How to Stalk People Effectively and Legally Through OSINT
<https://youtu.be/1F3yQFtYRBY> (18:33)
 - Reading:
 - * Zuboff, S. (2015). Big other: surveillance capitalism and the prospects of an information civilization. *Journal of Information Technology*, 30(1), 75-89. <https://doi.org/10.1057/jit.2015.5>.*
 - * Trittin-Ulbrich, H., Scherer, A. G., Munro, I., & Whelan, G. (2020). Exploring the dark and unexpected sides of digitalization: Toward a critical agenda. *Organization*, 1350508420968184. <https://doi.org/10.1177/1350508420968184>.*
 - * Cloarec, J. (2020). The personalization–privacy paradox in the attention economy. *Technological Forecasting and Social Change*, 161, 120299. <https://doi.org/10.1016/j.techfore.2020.120299>.
 - * Ajunwa, I. (2020). The “black box” at work. *Big Data & Society*, 7(2), 1-6. <https://doi.org/10.1177/2053951720938093>.
- In-class activities (May 26, 2023):
 - Group presentation #10: Data and Surveillance
 - Discussant: Group #4 and Group #12
 - Synchronous session: Seminar and discussion
- Post-class activities:
 - Assignment: Conduct a surveillance using an open source intelligence (OSINT) tool.
 1. Choose an OSINT tool: There are numerous open source OSINT tools available on the internet, each serving different purposes. Some of these include Shodan (<https://shodan.io>), OSINT Framework (<https://osintframework.com>), Maltego, theHarvester, Intel-ligence X, among others. You should choose at least one OSINT tool for the assignment.
 2. Understand the Tool: You should research the chosen tool, understand its functionalities, and learn how to use it. Take notes on the types of data the tool can gather, the sources it uses, and any special features it has. See for example <https://csirt.umm.ac.id/2022/06/apa-itu-osint-opent-source-intelligence/> or <https://medium.com/tlab-circle/tutorial-maltego-part-1-2aad60700156>.

3. Test the Tool: You should use the tool to gather data on a subject of their choice. This could be a company, a campus, a website, a public figure, or another relevant subject. Remember to adhere to ethical guidelines, respect privacy, and follow all legal principles during this step.
4. Evaluate the Tool: Based on your research and testing, you should evaluate the tool's effectiveness. Consider factors like the accuracy and relevance of the data, the usability of the tool, and any limitations they noticed.
5. Write a Report: Compile your findings into a report. The report should include a description of the tool, an explanation of how it works, a summary of your testing process and results, and your evaluation of the tool. You should also discuss potential applications and use-cases for the tool in an OSINT context.
6. Submit before June 9, 2023 to sumberkebahagianmu@gmail.com.

- Reflective questions:

- Why technological innovation tend to 'datafy' our lives?
- How is data surveillance going to change our lives?
- What are the risks of data surveillance to our privacy as well as our free will?
- What are the role of businesses, governments, and general public in ensuring a fair and transparent data exchanges?

Session 12: Post-Truth and Disinformation

Session 12 delves into the ramifications of the digital economy, with an emphasis on the not-so-glamorous aspects of our increasingly interconnected world. As emerging technologies continue to propel economies to new heights, the pace of change is accelerating, reshaping the way societies, institutions, businesses, and individuals interact. While the scales of growth and deflation are being continually fine-tuned, these developments bring with them a host of implications that extend far beyond the economic realm. However, the potential negative impacts of these innovations are often overlooked, overshadowed by the promise of progress and prosperity that they ostensibly represent.

The myopic focus on the positive aspects of technological advancements has, to an extent, blinded us to the numerous pitfalls that accompany them. This session aims to recalibrate our understanding of these innovations, shedding light on their potential and perceived negative impacts. It is imperative that we acknowledge these potential downsides and endeavor to mitigate them, lest they outweigh the benefits. From hoaxes and misinformation to misuse and manipulation, the digital age presents a minefield of issues that require careful navigation.

Among the many challenges posed by the digital age, the issue of disinformation and its role in shaping behavior and influencing public discourse is particularly pressing. The proliferation of false information, often fueled by nefarious motives, can have far-reaching consequences. Similarly, the risk of monopolies forming in the digital sphere, unchecked by traditional market forces, is another significant concern. This session will delve into these issues, providing a comprehensive exploration of the post-truth era we find ourselves in and the phenomenon of disinformation that underpins it. We will critically analyze these challenges, seeking to propose potential solutions and strategies to combat them.

- Measurements and indicators: CO3, CO5, LI10

- Pre-class activities:

- Video lecture: Post-truth and disinformation
<https://youtu.be/S47cLCscKns> (30:33)

- Reading:

- * LSE. (2019). Tackling the Information Crisis: A Policy Framework for Media System Resilience, *LSE Commission on Truth, Trust, and Technology*. Available at https://en.unesco.org/sites/default/files/journalism_fake_news_disinformation_print_friendly_0.pdf.*
- * Posetti, J., & Matthews, A. (2018). *A short guide to the history of 'fake news' and disinformation*. International Center for Journalists, 2018-07. https://www.icfj.org/sites/default/files/2018-07/A%20Short%20Guide%20to%20History%20of%20Fake%20News%20and%20Disinformation_ICFJ%20Final.pdf.*
- * Marwick, A., & Lewis, R. (2017). *Media manipulation and disinformation online*. New York: Data & Society Research Institute. https://datasociety.net/pubs/oh/DataAndSociety_MediaManipulationAndDisinformationOnline.pdf.
- * Fetzer, J. H. (2004). Disinformation: The use of false information. *Minds and Machines*, 14(2), 231-240. <https://doi.org/10.1023/B:MIND.0000021683.28604.5b>.
- * Waisbord, S. (2018). Truth is what happens to news: On journalism, fake news, and post-truth. *Journalism Studies*, 19(13), 1866-1878. <https://doi.org/10.1080/1461670X.2018.1492881>.
- * Ireton, C., & Posetti, J. (2018). Journalism, 'Fake News' & Disinformation. *Handbook for Journalism Education and Training*. UNESCO. Available at <https://www.lse.ac.uk/media-and-communications/assets/documents/research/T3-Report-Tackling-the-Information-Crisis.pdf>.
- * Lewandowsky, S., Ecker, U. K., & Cook, J. (2017). Beyond misinformation: Understanding and coping with the "post-truth" era. *Journal of Applied Research in Memory and Cognition*, 6(4), 353-369. <https://doi.org/10.1016/j.jarmac.2017.07.008>.
- * Iyengar, S., & Massey, D. S. (2019). Scientific communication in a post-truth society. *Proceedings of the National Academy of Sciences*, 116(16), 7656-7661. <https://doi.org/10.1073/pnas.1805868115>.
- * Rochlin, N. (2017). Fake news: belief in post-truth. *Library Hi Tech*, 35(3), 386-392.
- * Marwick, A., & Lewis, R. (2020). *Media Manipulation and Disinformation Online*. Available at https://datasociety.net/pubs/oh/DataAndSociety_MediaManipulationAndDisinformationOnline.pdf.
- * Post-truth dan Medsos di Indonesia, *Harian Republika*, 15 Desember 2016. Available at <https://www.republika.co.id/berita/koran/opini-koran/16/12/15/oi7ss211-posttruth-dan-medsos-di-indonesia> or <http://nofieiman.com/wp-content/images/paper-post-truth-dan-medsos-di-indonesia.pdf>.
- * Demokrasi dan Teknologi, *Harian Republika*, October 29, 2019, 6. Available at <http://nofieiman.com/wp-content/images/paper-demokrasi-teknologi.jpeg>.

- In-class activities (May 26, 2023):

- Group presentation #11: Post-Truth and Disinformation

- Discussant: Group #1 and Group #5
- Synchronous session: Seminar and discussion
- Reflective questions:
 - Has the country consistently become a more equal and just society?
 - How has digital technology impacted polarization?
 - How has digital technology impacted equality?
 - How do we find the 'truth' in the digital era?

Session 13: Digital Sustainability

Digital sustainability refers to the practice of using technology and digital resources in a manner that meets current needs without compromising future generations' ability to meet their own needs. This concept borrows from the larger concept of sustainability, extending it to the digital world with a focus on social, economic, and environmental dimensions.

Digital sustainability can mean different things in different contexts. It may refer to the long-term maintenance and preservation of digital assets, such as databases, documents, and multimedia content. It can also refer to the use of digital technology in a way that supports sustainable development, such as using data analytics to optimize resource use or using virtual meetings to reduce travel and carbon emissions.

From another perspective, digital sustainability also involves the sustainable production and disposal of digital devices. This includes issues such as energy use, e-waste, and the use of conflict minerals in device manufacturing.

In the educational context, students equipped with knowledge about digital sustainability will be better prepared to navigate and contribute to the digital economy in a responsible and sustainable way. They can bring this perspective to their future roles, driving change and innovation in their organizations.

- Measurements and indicators: CO3, CO5, LI7
- Pre-class activities:
 - Video lecture: Digital sustainability (part 1)
<https://youtu.be/UKfAY5HGAZO> (31:13)
 - Video lecture: Digital sustainability (part 2)
<https://youtu.be/BbUTY007WS8> (22:13)
 - Reading:
 - * Stuermer, M., Abu-Tayeh, G., & Myrach, T. (2017). Digital sustainability: basic conditions for sustainable digital artifacts and their ecosystems. *Sustainability Science*, 12, 247-262. <https://doi.org/10.1007/s11625-016-0412-2>.*
 - * Anadon, L. D., Chan, G., Harley, A. G., Matus, K., Moon, S., Murthy, S. L., & Clark, W. C. (2016). Making technological innovation work for sustainable development. *Proceedings of the National Academy of Sciences*, 113(35), 9682-9690. <https://doi.org/10.1073/pnas.1525004113>.*
 - * Arogyaswamy, B. (2020). Big tech and societal sustainability: an ethical framework. *AI & Society*, 35(4), 829-840. <https://doi.org/10.1007/s00146-020-00956-6>.

- * George, G., Merrill, R. K., & Schillebeeckx, S. J. (2021). Digital sustainability and entrepreneurship: How digital innovations are helping tackle climate change and sustainable development. *Entrepreneurship Theory and Practice*, 45(5), 999-1027. <https://doi.org/10.1177/1042258719899425>.
- * Görland, S. O., & Kannengießer, S. (2021). A matter of time? Sustainability and digital media use. *Digital Policy, Regulation and Governance*, 23(3), 248-261. <https://doi.org/10.1108/DPRG-11-2020-0160>.
- * Lock, I., & Seele, P. (2017). Theorizing stakeholders of sustainability in the digital age. *Sustainability Science*, 12, 235-245. <https://doi.org/10.1007/s11625-016-0404-2>.
- * Seele, P. (2016). Envisioning the digital sustainability panopticon: a thought experiment of how big data may help advancing sustainability in the digital age. *Sustainability Science*, 11, 845-854. <https://doi.org/10.1007/s11625-016-0381-5>.
- * Kouhizadeh, M., Saberi, S., & Sarkis, J. (2021). Blockchain technology and the sustainable supply chain: Theoretically exploring adoption barriers. *International Journal of Production Economics*, 231, 107831. <https://doi.org/10.1016/j.ijpe.2020.107831>.
- * Esmailian, B., Sarkis, J., Lewis, K., & Behdad, S. (2020). Blockchain for the future of sustainable supply chain management in Industry 4.0. *Resources, Conservation and Recycling*, 163, 105064. <https://doi.org/10.1016/j.resconrec.2020.105064>.

- In-class activities (June 9, 2023):

- Group presentation #12: Digital Sustainability
- Discussant: Group #2 and Group #6
- Synchronous session: Seminar and discussion

- Reflective questions:

- How can digital technologies be used to address environmental challenges in community or industry?
- What principles of sustainable design can be applied to the development of new digital technologies or services?
- How can we ensure that the benefits of digital technology are shared widely, without exacerbating social or environmental inequalities?
- What policies or regulations could help promote digital sustainability?
- How might trends such as artificial intelligence, internet of things, or blockchain support (or hinder) digital sustainability?
- When is digital more sustainable than physical (e.g., reading online vs printing, virtual meetings vs travel), and vice versa?
- Can we think of an innovative idea that uses digital technology to promote sustainability? What would it take to make this idea a reality?

Session 14: Concluding Remarks

As we journey into our final session, Session 14, we are presented with the valuable opportunity to reflect upon and consolidate the myriad concepts we have explored throughout the course. This is a time for

summing up and looking back at our shared intellectual journey since the start of the semester. Our goal is to encapsulate the essential aspects of the knowledge we've gained, with a specific emphasis on the conceptual framework used for understanding and managing information and technological innovation in the dynamic landscape of the digital economy.

In the process of this comprehensive review, we do not just skim over the surface; rather, we dive deep into the core of each topic to extract meaningful insights and connections that reinforce our learning. This final session is also a platform for thoughtful reflection on the implications of our course content for real-world applications and future research directions. The aim is not merely to recall the topics covered but to engage in an intellectual dialogue that stimulates deeper understanding and appreciation of the field. As we conclude, we hope to leave you with a rich tapestry of knowledge, one that will inspire you to continue exploring and questioning the realms of digital innovation and information management.

- Measurements and indicators: CO4, LI10, LI12
- Pre-class activities
 - Video lecture: Concluding remarks
<https://youtu.be/RYgXQnTT00Q> (1:51)
- In-class activities (June 9, 2023):
 - Synchronous session: Wrap-up and closure
- Post-class activities:
 - Assignment: TBA
- Reflective questions:
 - Have you fulfilled intentions that you had set for yourself and this class?
 - What has changed in your thinking as a result of taking this class?
 - What will you do differently as a result of this class?

Final-Exam

Final-exam covers materials discussed in Session 8 to Session 14. This exam tests the students' understanding of digital platform, financial technology, artificial intelligence and machine learning, data and surveillance, including post-truth and disinformation, as well as digital sustainability.

Just like the midterm exam, please keep in mind that my tests are not about memorization. That is a waste of time in a world where we can Google most any fact. Instead, I will be interested in your showing me you understand the fundamental aspects of our materials and the applications of our learning.

8 Frequently Asked Questions:

Q: Is this a difficult class?

A: This class is rigorous and fairly demanding. I have high expectations for and of you. I have carefully designed your experience in this class to be interesting and engaging, and we will cover a lot of material. It is critical that you not get behind on the material. You should email me the moment you feel behind in this class.

Q: How to make the most of lectures?

A: Lectures are commonly used to offer an overview of the subject and/or to deliver detailed information on a subject. On the first case, you need to fill in the detail, while on the second case, you need to fill in the background. Lectures are usually providing you with a valuable resources by synthesizing the views of several researchers and complementing it with new and unpublished information.

To make the most of lectures, you obviously have to know your course and read before the lecture. During the lecture, you have to listen effectively and focus on the structure of the content. Your ability to listen will improve with experience. At the same time, you need to take notes using your own words and fewer words. Avoid taking too many detailed notes. Use your own style (such as abbreviations, spacing, highlight, color and image, handouts, etc.) and organize it to your liking.

Sometimes you might miss some points because your attention strays, but do not left behind. Do not be shy or afraid to follow up lectures afterwards. Use our seminars to clarify and discuss materials. Review your notes if deemed necessary. Compare your notes with another student's. Doing some reading and watching to the course videos will help you to keep up.

Q: How to make this course enjoyable?

A: Get obsessed with a topic and began asking question. This is probably the best time in your life to accumulate as much knowledge as possible before work and family commitment began creeping in. Find something that you really enjoy. Find ideas that make you so excited you cannot sleep. If a field does not yet exist around an idea you are particularly drawn to, that might be a very good sign.¹⁷

Learn to think original thoughts. Nurture your curiosity. Most people do not know how most things are defined or work, and most of the answers you have been given in this regard start to fall apart when you really poke at them.¹⁸ The obvious is that which is never seen until someone expresses it simply.¹⁹ Learn to be very sceptical when everyone talks about something as though it is obvious – few things in science are, at their core.

¹⁷Isaac Newton's Cambridge notebooks from his *Annus Mirabilis* are excellent in this regard. He has a page with very silly sounding questions. He was 21 at that time, alone in his college dormitory, and obsessively covering notebooks with questions like 'what is heat?', 'why do things stick together?', 'what is light?'.

¹⁸To test this hypothesis, try asking an adult why the government prints money or how banking system works.

¹⁹Alexander Grothendieck, one of the most influential mathematicians of the 20th century, famously became completely confused in college by what a teacher meant by volume. This is a simple concept everyone learns in high school, but he was completely confused by the explanation most high school students accept as rote. He subsequently made some of the most important mathematical advances in the 20th century.

Q: What if my team has dysfunctional membership?

A: I may collect peer feedback on team members' relative performance. Warning: In extreme cases where I determine that a team member did very little, I reserve the right to assign an "E" on the project to that person.

Q: Will we have quizzes?

A: We will have quizzes only if I determine that students are not keeping up in the class or not participating and contributing enough. If I do give a quiz, it becomes part of the class participation grade.

Q: Will I have to do homework not mentioned in this syllabus?

A: Probably not. If I do assign and collect the homework, it will become part of the participation grade. You may also be asked to speak on the topic in the weekly group assignment. There will be readings most nights and also some videos to watch.

Q: I am interested in coding and want to learn more. What should I do?

A: Build something excellent. Since you have more time now than you ever will, start working on a side project. Write a script. Create a website. Whatever. You are currently doing a college study.²⁰ You will have at least one or two years of freedom to do something. Use this time to pick a significant project and make real progress. Since we are mostly studying from home, your time is even (almost) completely your own. You can spend 40+ hours a week learning and doing original research uninterrupted. When you go to work or have a family, you might lose this free time.

Pick one project and work on it for at least one year. Discriminate between projects 'for show' and work that you truly find good and original. To get started quickly, find subjects that do not require spending money or buying expensive equipment, such as writing, design, coding, and programming. Be persistent and do not be afraid to 'show off' your work. Remember, the time you have now is really valuable.

The best people are actually somewhat 'embarrassed' by anything successful that they do, and immediately refocus on the next goal out of a desire to not think about the achievements of the past. Be that person. Do something significant with your life. Significance does not come from getting all sorts of badges on your LinkedIn profile or getting thousands of new followers on your social media presence. Significance comes from making a dent in the universe in such a positive way.

Learn to get work done, even if you do not feel like it at first. Find which actions lead to the flywheel of effects (such as positive reinforcement from others or successful completion of tasks you enjoy) that will motivate you to pursue a certain path. Carefully design systems for yourself. You must ensure that, if there is an important goal you would like to achieve, the clear-eyed version of yourself sets up a system to ensure that a later, less motivated of yourself will get it done.²¹

²⁰Appreciate that you are currently in such a privileged situation. People will not expect too much from you. Instead, they will most probably give you a lot of excuses and permissions to do many different things.

²¹You may feel extreme motivation after watching the Social Network movie or some random Korean dramas, but in the 11th hour get bored and tired of chasing down some abstract programming bug.

Q: How do I deal with lots of the hard stuff?

A: At times, college study can be quite torturing. You may feel depressed, anxious, or lonely – especially during this pandemic. You have to know that you are not alone. Find friends. Find a place where you can find people who are driven like you. Being around optimistic, motivated, intelligent peers is like intellectual rocket fuel. Read about people you admire and relate to. Biographies are a great way to journey through life with the most interesting people in history. In almost all cases, things will get better, and you will make it through. It always gets darkest before dawn.

Build a network of people you will work with for the rest of your life. This is going to be very useful especially after you graduate and go back to your hometown. Read about the X Club²² and the PayPal Mafia.²³ Optimism, ambition, and genuine niceness are great attributes in these types of groups. A good way to seed one is to set up a recurring dinner club with 5-6 people, or a chat group. Have fun with your friends. Go to the beach together, light a bonfire, and talk about ideas. Camp and hike together. Share life stories. Bake cookies and watch movies in your room. Build something together. Do experiments at home. Living with a great group can be truly exceptional.

Do not rely on being young or being student too much. This is a finite resource. Someone may be kind to you because you are at a particularly vulnerable stage of life, but relying on this will leave you psychologically crippled when you are an adult and/or realize you are not student anymore. On the other hand, you are in the 21st century and the Internet is at your fingertips. Let that be a reminder to you of what else is possible and how little effort it takes to combust success in your own life. Do not worry too much. Focus on finding something practical to work on, mentors that will value you for your true work, books that will delight you, and peers that will inspire you. There has never been a better time to be an ambitious student.

Q: Why this syllabus is so long?

A: I want to be as transparent as possible to my students. I want to be very clear since the beginning of the semester regarding almost everything, from the concept and the philosophy of this course to the expectation that I set for my students. Due to the length of this syllabus, it is suggested to print out and keep this syllabus as your guidance for the semester.

Q: Are there opportunities for bonus points in this class?

A: We may have bonus opportunities in the class if your submitted work are top notch beyond expectations.

Q: I have completed the class. What is next?

A: I have developed a series of videos to provide you with conceptual framework and departure point to understand and to manage innovation in the digital economy. These videos are about how to establish such an intelligible society, how to raise awareness of digital innovation, and more importantly, how to make us more educated and empowered.

Yet, it does not mean that we should stop here. Instead, it should raises more questions than answers. For example, what constitutes human being? When reverse engineering possible, should we 'create' (or

²²Take a look at <https://hekint.org/2020/01/08/the-x-club/>.

²³Read the story at <https://www.businessinsider.com/meet-the-paypal-mafia-the-richest-group-of-men-in-silicon-valley-2014-9>.

recreate) human? We realize AI have some sort of immortality. Should we 'kill' them? Who determine the fate of humanity and this universe? Or, are we becoming God?

Instructor Bio

I am a lecturer and faculty member at the Department of Management, Faculty of Economics and Business, Universitas Gadjah Mada. I joined the school in July 2016, and since then, I have worked with other lecturers and faculty members, both within Department of Management and other departments or faculties/schools, in varying capacities.

I got my PhD in Management from the London School of Economics and Political Science and an MSc in Management of Science, Technology and Innovation from the University of Manchester. I have been living in the UK for more than 5 years. Previously, I was a lecturer and researcher at Prasetiya Mulya Business School, Jakarta.

My scholarly work focuses mainly on technological innovation and dynamic corporate strategy. I have published numerous papers in various key international journals, including the Electronic Commerce Research and Applications, the Journal of Science and Technology Policy Management, the International Journal of Quality and Service Sciences, the Journal of Islamic Marketing, and so forth. I am also a member of the Academy of Management (AOM) and the British Academy of Management (BAM) since 2016, as well as the Association for Information Systems (AIS) and the Strategic Management Society (SMS).

I have been involved in numerous research and consulting projects at the strategic level, including the Ministry of Communication and Information Technology, the Indonesia Investment Coordinating Board (BKPM), PT Angkasa Pura Services (APS), PT Bank Pembangunan Daerah Jawa Tengah (Bank Jateng), PT Kereta Commuter Indonesia (KCI), among others. I also regularly write for newspapers and magazines – such as Jawa Pos, Kontan, Republika, SWA, The Jakarta Post – as well as published several books.

I am currently being assigned as an expert staff for the Minister of Transportation with a particular focus on digital transformation in the transportation sector. I am also working at the Quality Assurance Unit, Faculty of Economics and Business, Universitas Gadjah Mada.

Beyond teaching and research, I am an avid mid-handicap golfer and (used to be) a weekend cyclist.

Teaching Philosophy

I do not like to teach. Even if I do, I do not.

One thing that annoys me is when I am presenting a difficult concept, and someone would raise their hand. Their question was not asking for clarification. Instead, they want to know if this was going to be on the exam. It seems to me most students are suffering from bulimic learning. They study for exams so they can pass, get a diploma, get a good job, so they can hopefully someday have a decent life – only to find at middle age that it was all a waste of time and their life still miserable.

Instead of learning to give the 'right' answers, students should acquire a genuine humility and curiosity for life, and then become grounded in their own deepest identity. This, in my opinion, is a priceless quality of education and one which is often lacking in the factory education systems of today. Education should develop human qualities and curiosity that will prepare students well for future work and life – and this is much better than a purely transactional training.

I also believe that students should study things because they are difficult. They should have an epiphany. Their education should be the process of broadening their horizons rather than walking a narrow path. They should learn things because they are worth learning instead of because it is a hurdle to clear. Everyone's education should be an ongoing, lifelong process. As Victor Weisskopf once said, "It is not important what we cover in the class, it is important what you discover."

The role of the instructor is thus no longer lecturing students for hours. Instead, the instructor will provide students with direction and guidance, and ensure that help is available for them. Students will be facing several problems to be solved and learn relevant skills and knowledge necessary to solve these problems creatively. I fully expect this approach to have a very high independent success rate without too much telling students what to do. Using this approach, the course objectives and learning goals must be met, but how they are met is rather flexible.

More importantly, students need to make a plan, act on the plan, write their own journals, analyze if the plan worked or did not, and report their findings. Then the lessons learned shall be shared out to the rest of the class. If learning remains localized, teaching remains localized. Every student should have a chance to become a teacher – at least for themselves. "If you truly want to master something," Richard Feynman said, "teach it." The more you teach, the better you learn. Teaching is a powerful tool for learning indeed.

By doing so, I hope that you will eventually feel the complex pleasure of finally understanding something that you have assumed always be beyond you. There is probably no more better pleasure to be had than the ability to read between the lines and grasp its hidden meaning. And that is just the beginning.

I wish you all the best and I hope that you enjoy the course.

I am so excited to be offering you this very unique course. I am thrilled you are taking advantage of the great opportunity that is certain to give you that competitive advantage in the future.

Did I Miss Anything?

Nothing. When we realized you weren't here
we sat with our hands folded on our desks
in silence, for the full two hours

Everything. I gave an exam worth
40 percent of the grade for this term
and assigned some reading due today
on which I'm about to hand out a quiz
worth 50 percent

Nothing. None of the content of this course
has value or meaning
Take as many days off as you like:
any activities we undertake as a class
I assure you will not matter either to you or me
and are without purpose

Everything. A few minutes after we began last time
a shaft of light suddenly descended and an angel
or other heavenly being appeared
and revealed to us what each woman or man must do
to attain divine wisdom in this life and
the hereafter
This is the last time the class will meet
before we disperse to bring the good news to all people on earth

Nothing. When you are not present
how could something significant occur?

Everything. Contained in this classroom
is a microcosm of human experience
assembled for you to query and examine and ponder
This is not the only place such an opportunity has been
gathered

but it was one place

And you weren't here

—Tom Wayman²⁴

²⁴Poetry 180/A Poem a Day for American High Schools, Hosted by Billy Collins, U.S. Poet Laureate, 2001-2003
<http://www.loc.gov/poetry/180/p180-list.html>