

Theoretical Frameworks and Research Methods in the Study of MOOC/e-Learning Behaviors: A Theoretical and Empirical Review

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Purpose of this study

- Studies of MOOCs focus on various topics:
 - MOOCs design and curriculum,
 - MOOCs platform or providers,
 - e-learning technology improvement,
 - online learning communities
 - demographic characteristics of MOOCs users
 - applications of MOOCs in different academic disciplines
 - assessment issues of MOOCs
 - pedagogical designs for MOOCs
 - *User acceptance and adoption of MOOCs.....*
- This paper focuses on the **factors affecting the adoption of MOOCs/e-Learning**

Databases and keyword search

- **Keywords:**
 - MOOCs; user intention and behavior; technology adoption; acceptance model
- **Databases:**
 - ProQuest,
 - Ebsco,
 - Web of Science,
 - Conference proceedings,
 - PhD and Master dissertations;
 - publicly available search engines such as Google Scholar, Yahoo, Bing, etc.).

Theoretical frameworks

- 78 full academic papers were identified.
- dozens of theories or models used in the study of MOOCs or e-Learning behavior:
 - Expectation–Confirmation Model (ECM),
 - ADDIE (analysis, design, development, implementation, and assessment) Model,
 - Carroll’s Model of School Learning, the
 - Theory of Reasoned Action (TRA),
 - Theory of Planned Behavior (TPB),
 - Technology Acceptance Model (TAM),
 - Motivational Model (MM),
 - Decomposed Theory of Planned Behavior (DTPB),
 - Combined TBP/TAM,
 - Model of PC Utilization,
 - Innovation Diffusion Theory (IDT),
 - Social Cognitive Theory (SCT),
 - Unified Theory of Acceptance and Use of Technology (UTAUT).....

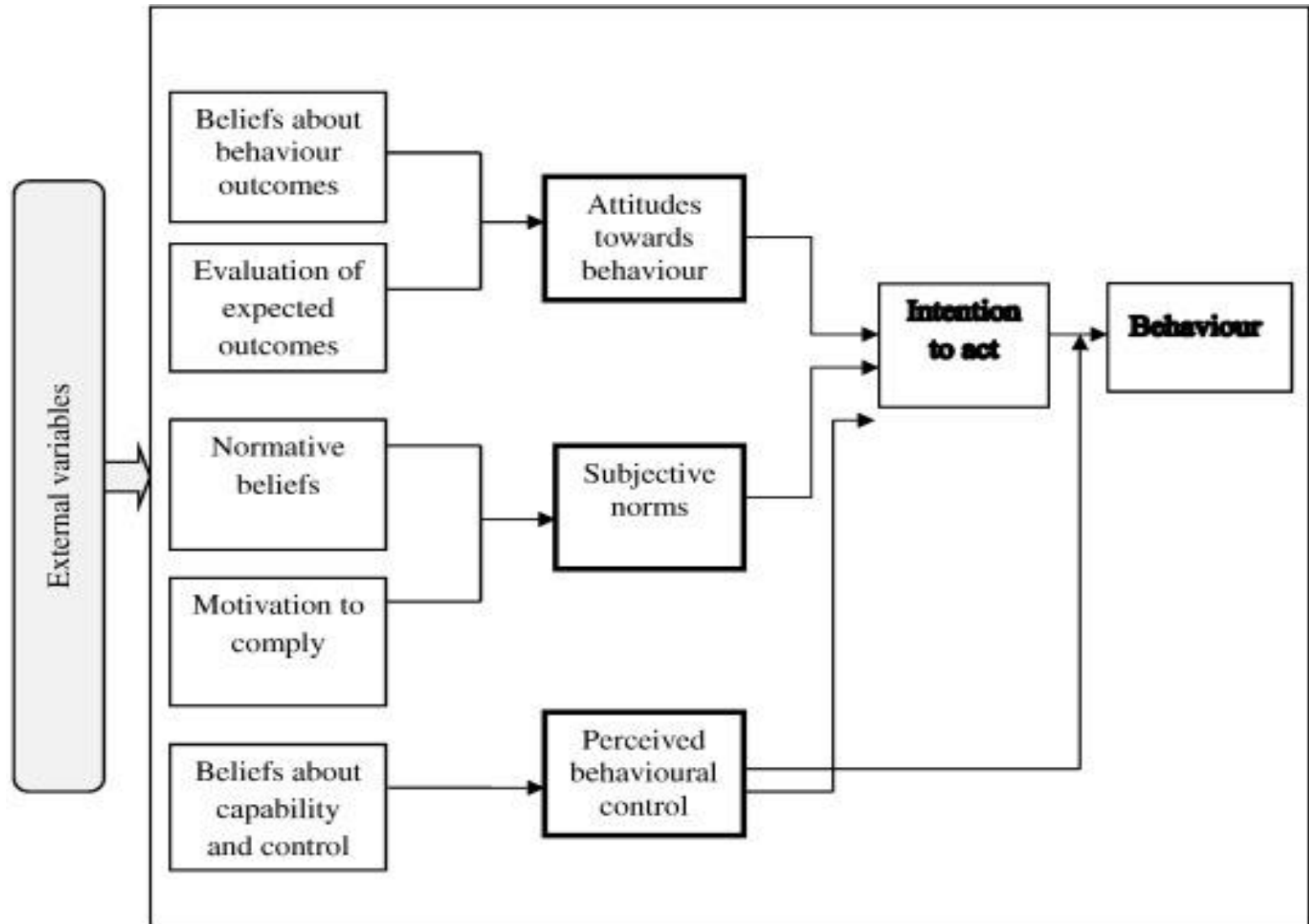
Study targets and research method

- Among the 78 full academic papers,
 - 42 (54%) of the papers use **TAM** (*Technology Acceptance Model*) as the framework;
 - 12 (15%) of them use **UTAUT** (*Unified Theory of Acceptance and Use of Technology*);
 - 8 (10%) of them use **TPB** (*Theory of Planned Behavior*);
 - while the rest 16 (21%) papers adopt other acceptance theories as theoretical frameworks.
- This study focuses on *the above three widely used theoretical frameworks or models* in the study of user intention and adoption of MOOCs through *a qualitative analysis of the literature*.

MOOCs/e-Learning Studies

- MOOCs are viewed as a massive e-learning;
- There are times that some scholars studied the user adoption of e-learning with the most recent trend of MOOCs as an example. Therefore, literature on the user acceptance and adoption of E-learning platforms such as *Learning Management System (LMS)*, *Mobile Learning (M-learning or m-learning)*, and *Open Educational Resources (OER)* where MOOCs are used as examples are also our targets for analysis.

Theory of Planned Behavior (TPB)



Case I: theoretical framework

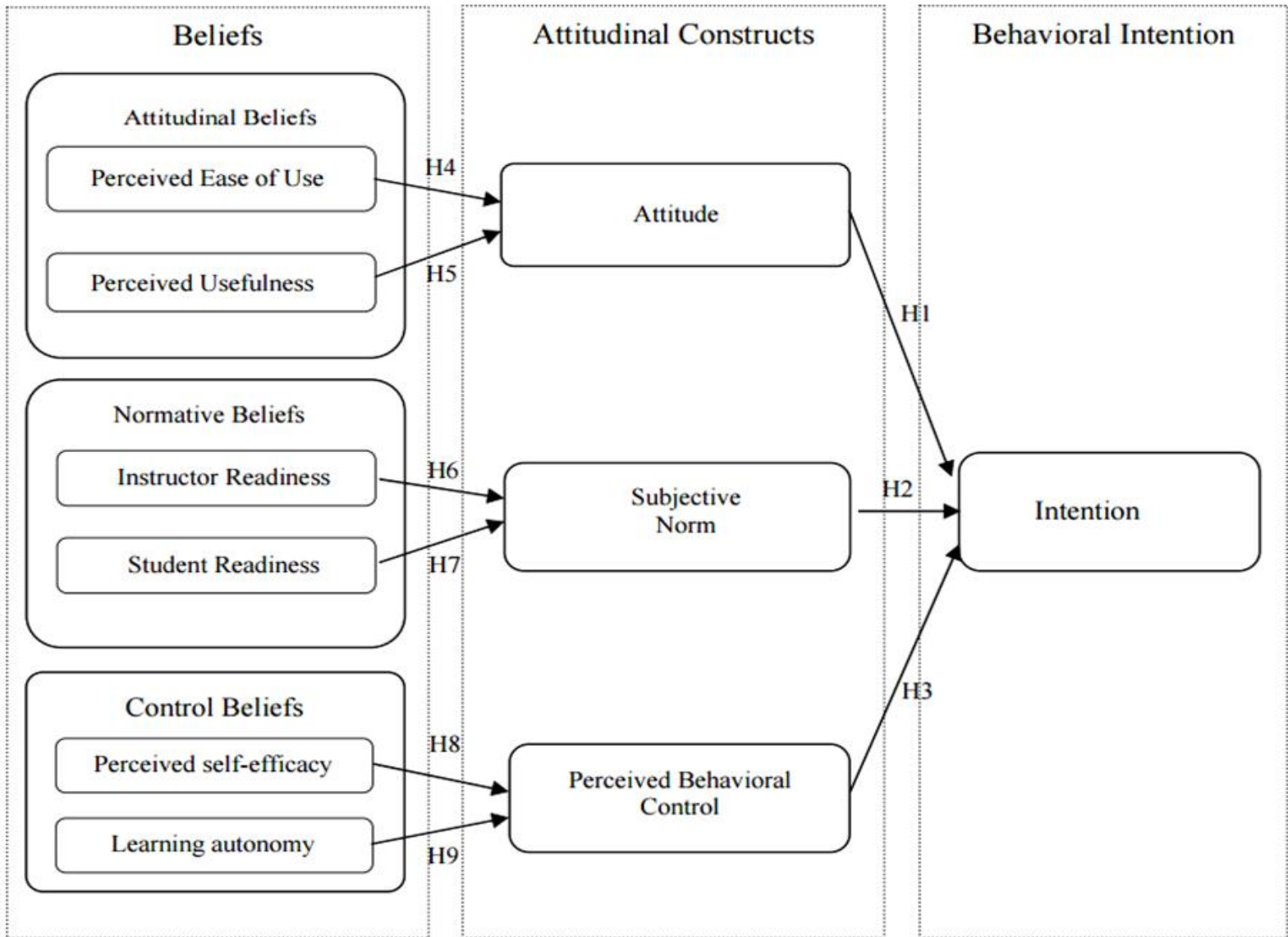


Figure 2 research model of Cheon et al. (2012).

research method: survey

Appendix A. Survey items used in the study

Perceived Ease of Use

PEOU1: I believe that mobile devices would be easy to use.

PEOU2: I believe it would be easy to access course material with my mobile device.

PEOU3: I believe that mobile devices would be easy to operate.

Perceived Usefulness

PU1: I believe that using mobile devices would improve my ability to learn.

PU2: I believe that mobile devices would allow me to get my work done more quickly.

PU3: I believe that mobile devices would be useful for my learning.

Attitude

ATT1: I would like my coursework more if I used m-learning.

ATT2: Using m-learning in my coursework would be a pleasant experience.

ATT3: Using m-learning in my coursework is a wise idea.

Instructor Readiness

IR1: I think instructors would be in favor of utilizing m-learning for their courses.

IR2: I think instructors would believe that a mobile device could be a useful educational tool in their courses.

IR3: I think instructors would possess adequate technical skills to use a mobile device in their teaching.

Student Readiness

SR1: I think other students would be in favor of utilizing m-learning in their coursework.

SR2: I think other students would believe that a mobile device could be a useful educational tool in their coursework.

SR3: I think other students would possess adequate technical skills to use a mobile device in their coursework.

Subjective Norm

SN1: Most people who are important to me think that it would be fine to use a mobile device for university courses.

SN2: I think other students in my classes would be willing to adapt a mobile device for learning.

SN3: Most people who are important to me would be in favor of using a mobile device for university courses.

Case 2: theoretical framework

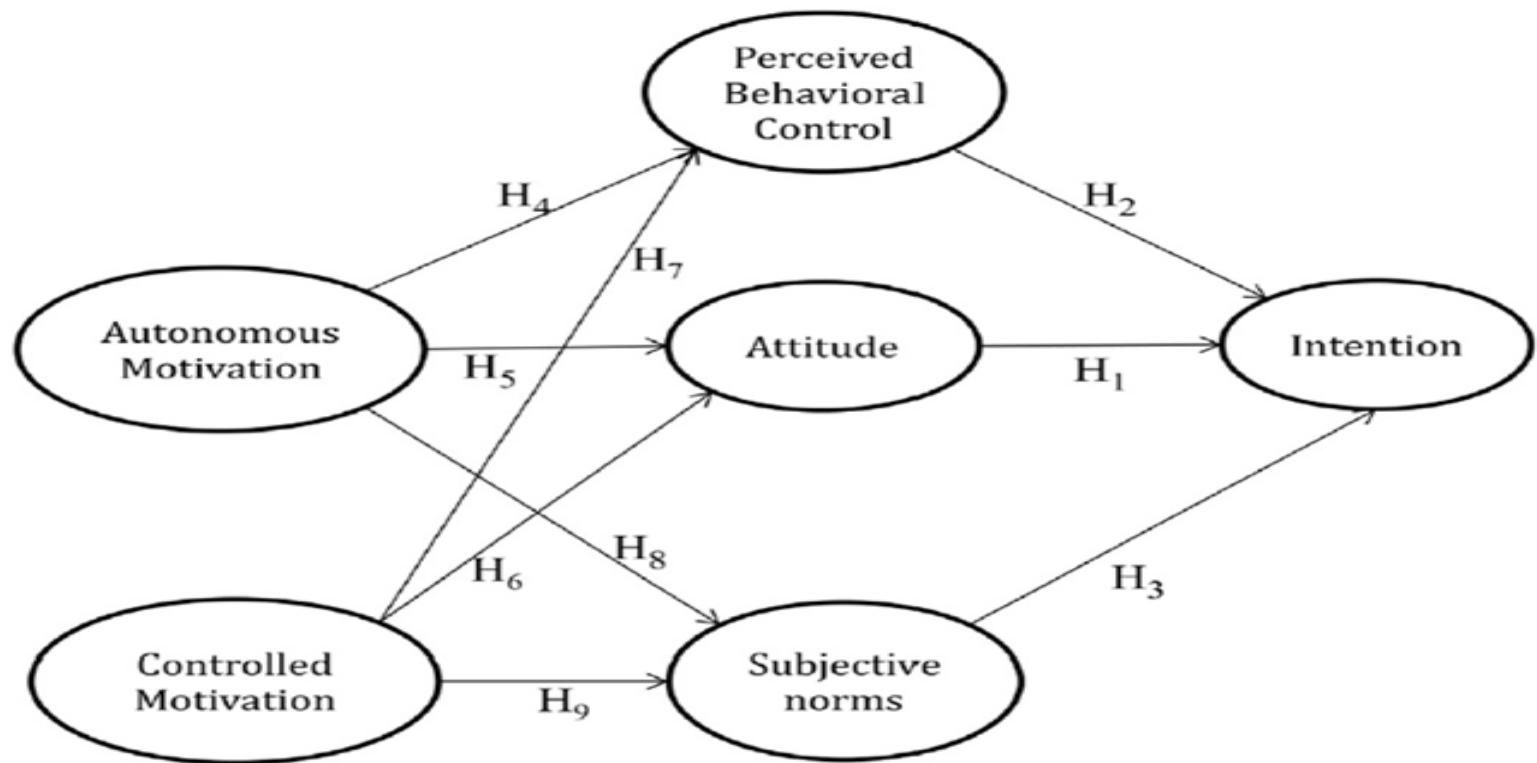


Figure 4 Zhou, M. (2016)

Case 2 research method:

an online questionnaire adapted to the context of MOOCs

Constructs	No	Items
Behavioral intention	INT1	I intend to continue to use MOOCs in learning in the future.
	INT2	I plan to use MOOCs in learning in the future.
	INT3	I will insist using MOOCs to study the courses I registered.
Attitudes	ATT1	Once I start using MOOCs in learning, I find it hard to stop.
	ATT2	Study is more interesting with MOOCs in learning.
	ATT3	I have fun using MOOCs in learning.
Subjective norms	SN1	The teachers in my university support the use of MOOCs in learning.
	SN2	People who are important to me think that I should use MOOCs in learning.
	SN3	The people whose views I respect support the use of MOOCs in learning.
Perceived behavioral control	PBC1	I have the knowledge necessary to use MOOCs in learning.
	PBC2	I have control over MOOCs at learning.
	PBC3	I have the resources necessary to use MOOCs in learning.
Controlled motivation	CTRL1	I use MOOCs because other people say I should.
	CTRL2	I feel under pressure from my friends/family/spouse to use MOOCs.
	CTRL3	I use MOOCs because my friends/family/spouse say(s) I should.
	CTRL4	I feel ashamed when I do not use MOOCs to learn.
Autonomous motivation	AUTO1	It is important for me to use MOOCs to learn.
	AUTO2	I value the benefits of using MOOCs.
	AUTO3	I think it is important to make the effort to use MOOCs for learning.
	AUTO4	I study on MOOCs because it is meaningful.
	AUTO5	I enjoy studying on MOOCs.
	AUTO6	I find learning in MOOCs a pleasurable activity.

Case 3: theoretical framework

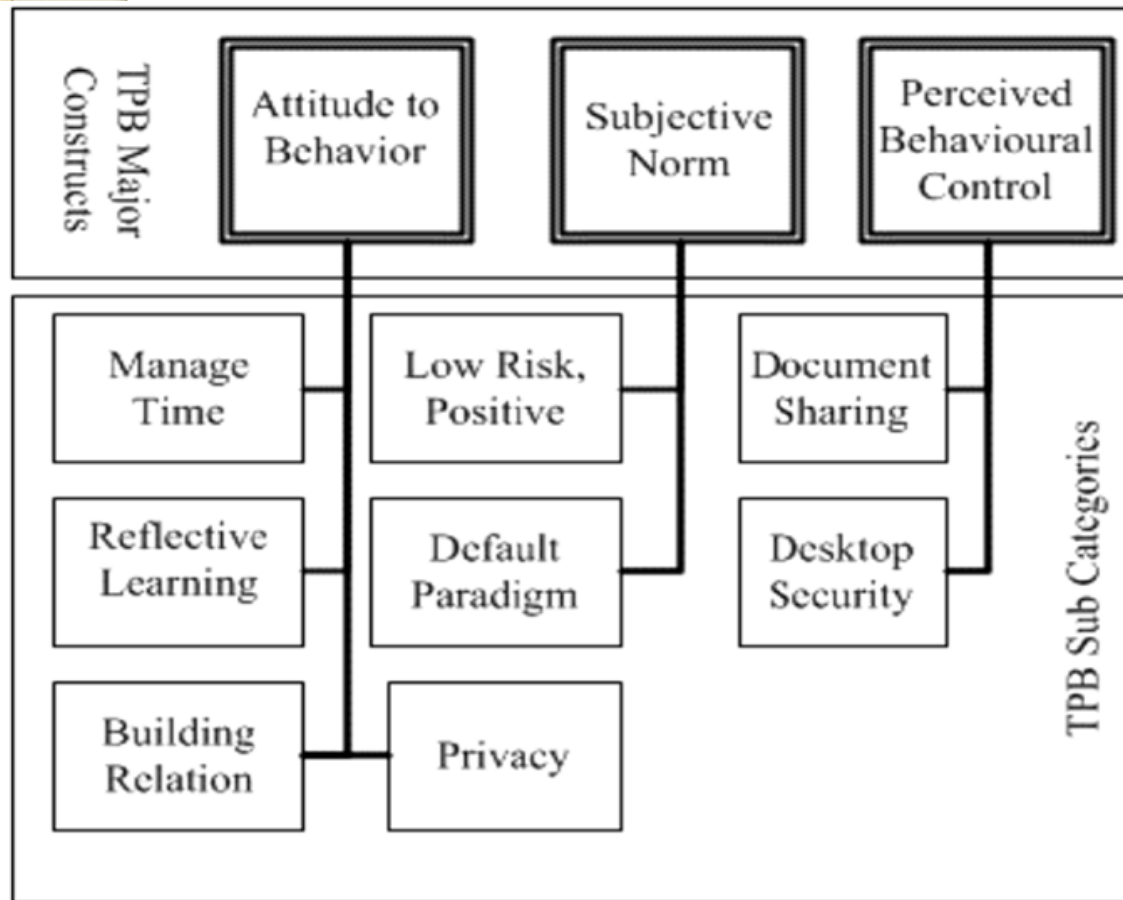


Figure 3 Clutterbuck, et al. (2015)

- **Research methods:**
- **Qualitative**
- (semi-structured scripts with open-ended questions and probes)
 - Deductive approach
- **Quantitative**
- (survey via a TPB questionnaire)

Applicability of TBP

If researchers' main concern is how **the attitudinal constructs** influence the behavioral intention and usage of MOOCs, TPB would be the suitable model.

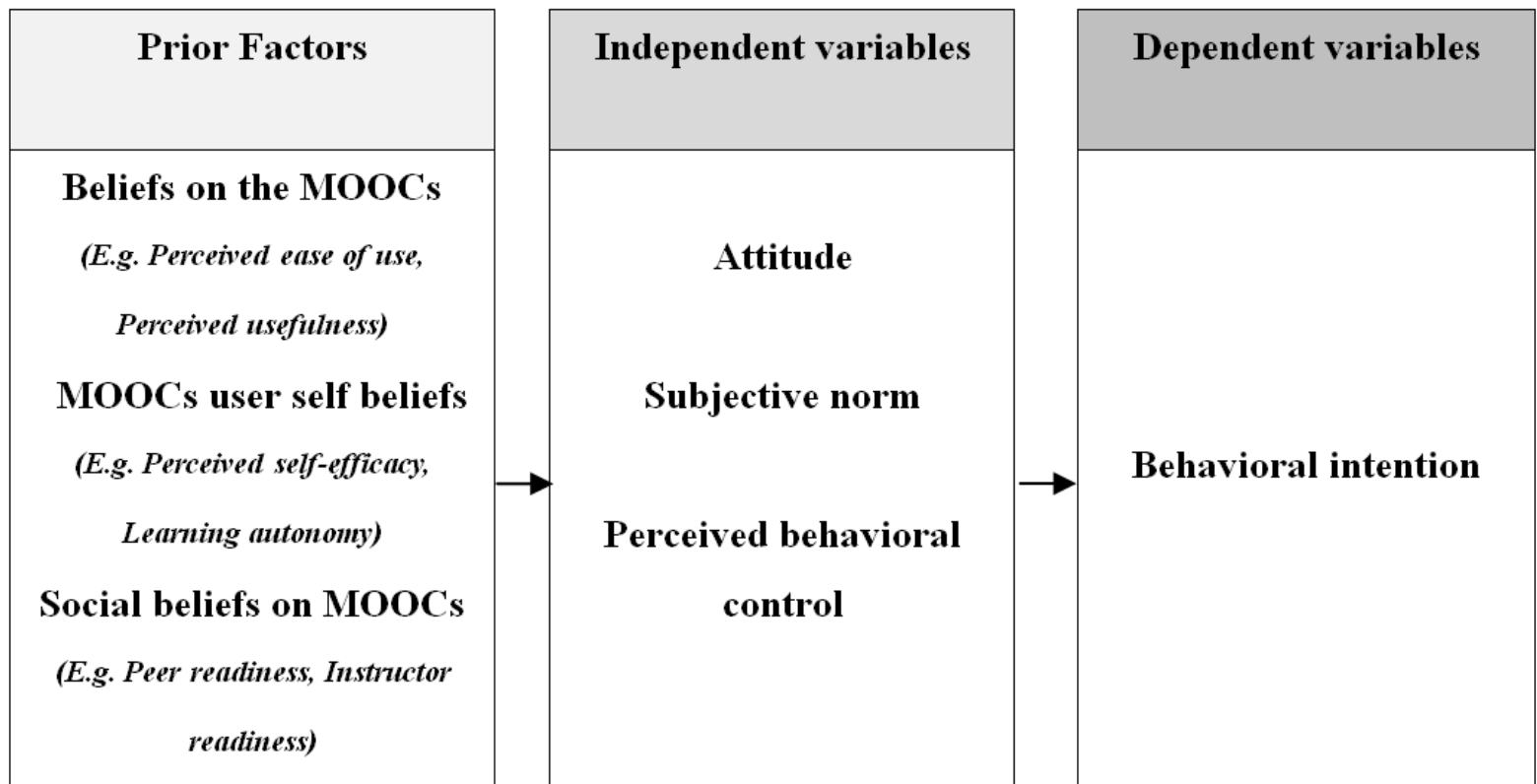
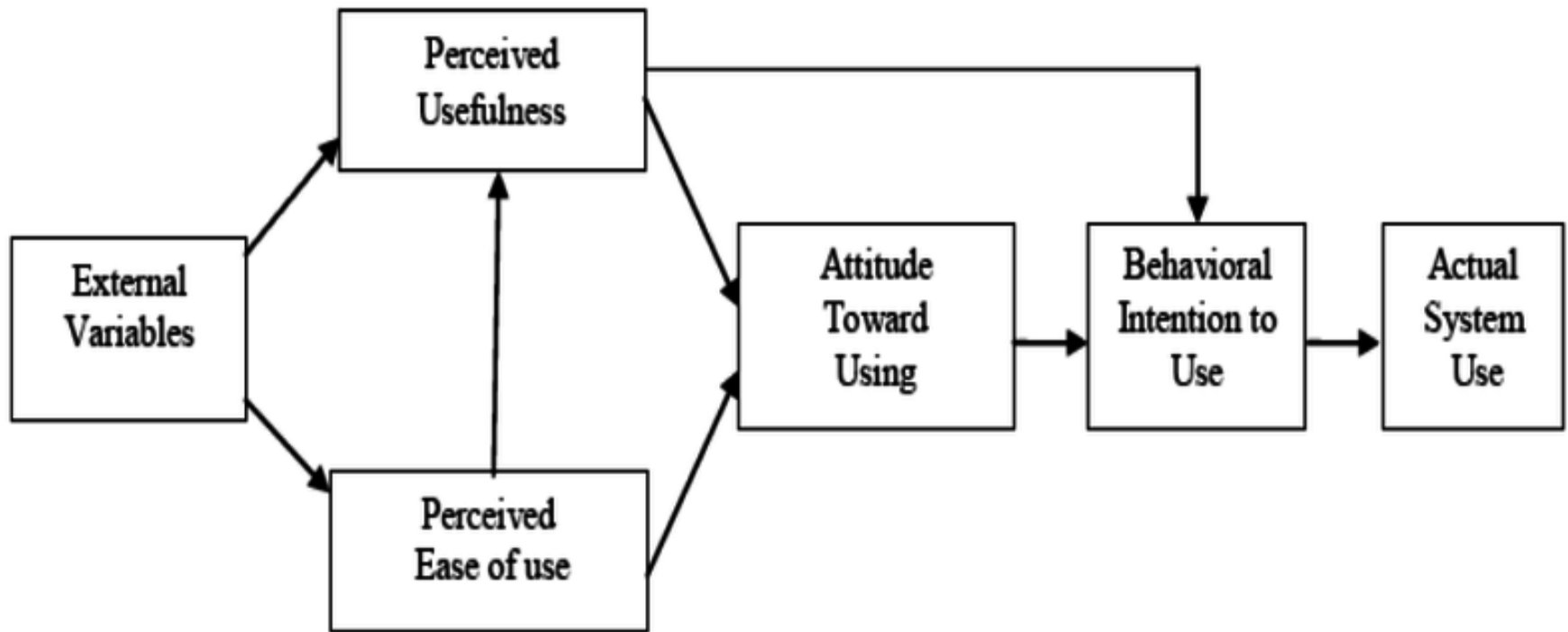


Figure 15: A summary of TPB factors

The Technology Acceptance Model (TAM)



Case I: theoretical framework

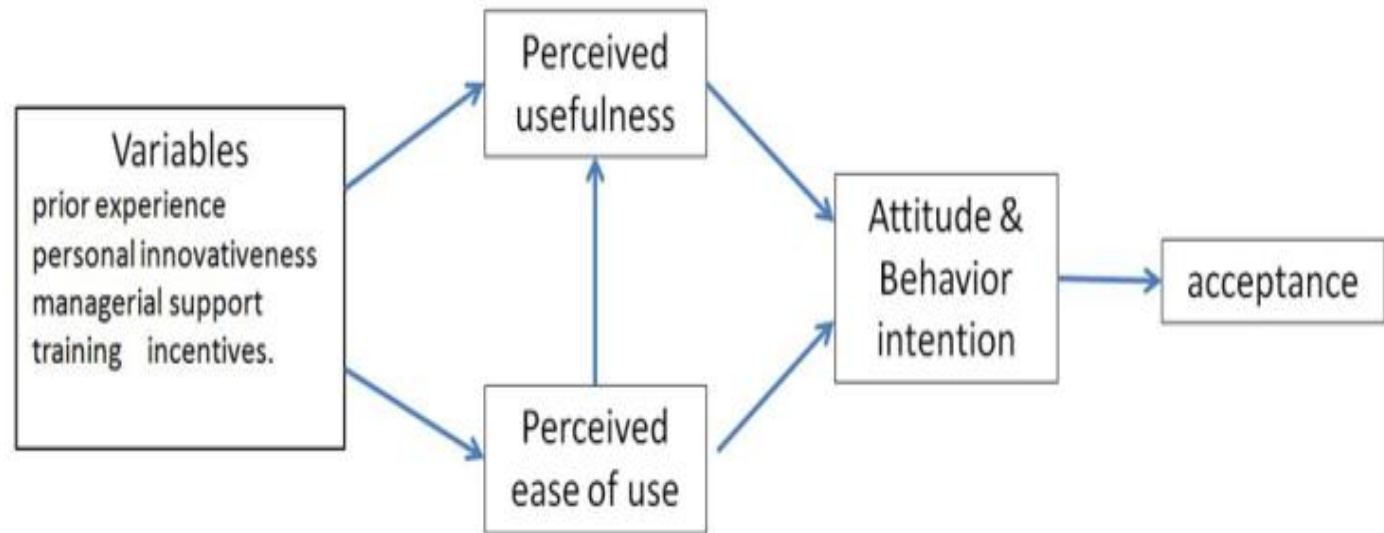


Figure 7 model by Yulia Lvovskaya & Sofoklis Per Lamprou (2015)

research methods:

Case study and semi-structured interviews



Concept	Theoretical definition	Conceptual definition	Measurement	Questions
Prior experience	Individual's past experience with similar innovation (Talukder, 2011)	To get an understanding of individuals prior experience affect their adoption	Skills (Lee et al., 2006) Experience (Farr & Ford 1990) Relevant job (Igbaria et al., (1996)	What were your relevant competencies/experiences before launching a MOOC?
Personal Innovativeness	Individual's willingness to use an innovation (Agarwal and Prasad, 1998)	To gain a deeper understanding of how individuals perceive the opportunities with MOOCs	Early to adopt an innovation (Agarwal and Prasad, 1998) Tendency to accept an innovation (Frambach & Schillewaert, 2002) Receptiveness to change (Zmud, 1984)	How do you believe MOOC will affect your role at the university? What new skills do you think has been developed within the organization during this period?
Managerial support	The extent to which managers provide an opportunity to acquire new skills through participating in continuous learning (Facteau et al., 1995)	To get an understanding in how the support by the management have affected the adoption process	Encouragement (Talukder, 2011) Allocation of resources (Talukder, 2011) Opportunity to acquire new skills (Facteau et al., 1995)	Have you received support from the platform supplier? What are your experience of all the participants in this project, have the feeling been positive or reluctant, has there been a need for persuasion?
Training	Creation of knowledge transfer (Venkatesh, 1999)	To get an understanding if the training has been sufficient and beneficial when creating MOOC	Communicate procedural and conceptual knowledge (Venkatesh, 1999)	What type of training activities have been offered?
	Material or other benefits that	To gain a deeper	Material or other benefits (Talukder,	Have you received much recognition or appreciation from the management for the

Case 2: theoretical framework

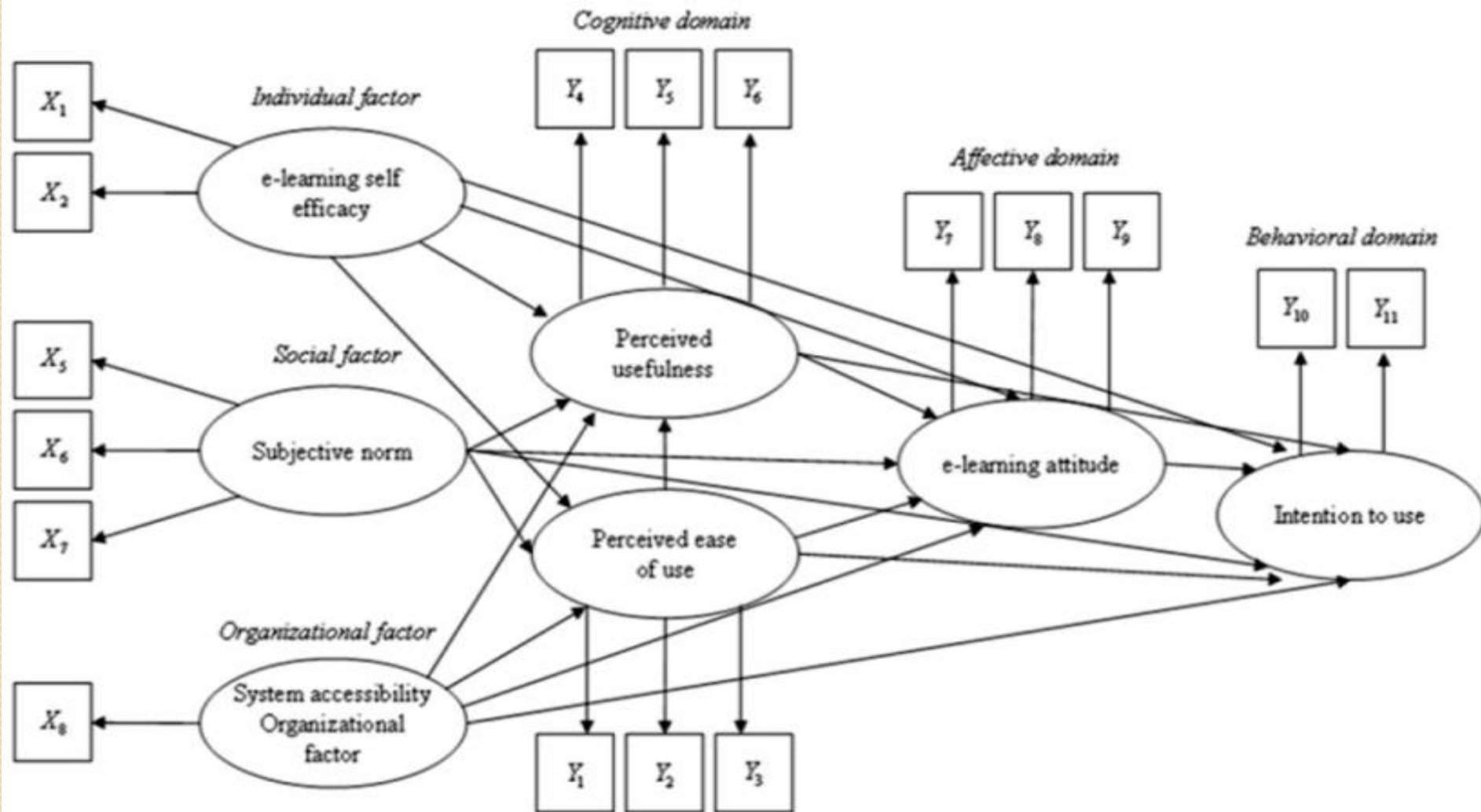


Figure 9 Theoretic interesting model by Sung Youl Park (2009)

Case 2 research method: Questionnaire

Perceived usefulness (PU)	E-learning would improve my learning performance (U ₁).	4.27 (1.29)	.91	
	E-learning would increase academic productivity (U ₂).	4.30 (1.31)	.93	.88/.74
	E-learning could make it easier to study course content (U ₃)	4.20 (1.39)	.72	
Attitude (AT)	Studying through e-learning is a good idea (A ₁).	4.69 (1.43)	.95	
	Studying through e-learning is a wise idea (A ₂).	4.51 (1.41)	.93	.94/.84
	I am positive toward e-learning (A ₃).	4.16 (1.39)	.86	
Behavioral intention (BI)	I intend to check announcements from e-learning systems frequently (B ₁).	4.88 (1.07)	.74	.79/.66
	I intend to be a heavy user of e-learning system (B ₂).	4.52 (1.22)	.88	
e-learning self-efficacy (SE)	I feel confident finding information in the e-learning system (S ₁).	4.57 (1.16)	.85	.76/.63
	I have the necessary skills for using an e-learning system (S ₂).	4.92 (1.23)	.73	
Subjective norm (SN)	What e-learning stands for is important for me as a university student (N ₁).	4.07 (1.27)	.84	
	I like using e-learning based on the similarity of my values and society values underlying its use (N ₂).	3.85 (1.37)	.86	.89/.73
	In order for me to prepare for future job, it is necessary to take e-learning courses (N ₃).	4.02 (1.41)	.84	
System accessibility (SA)	I have no difficulty accessing and using an e-learning system in the university (SA).	5.01 (1.53)	1.0	n/a

Scale: 1 = strongly disagree ~ 7 = strongly agree. All loadings were significant based on t-values.

Case 3: framework (TAM3)

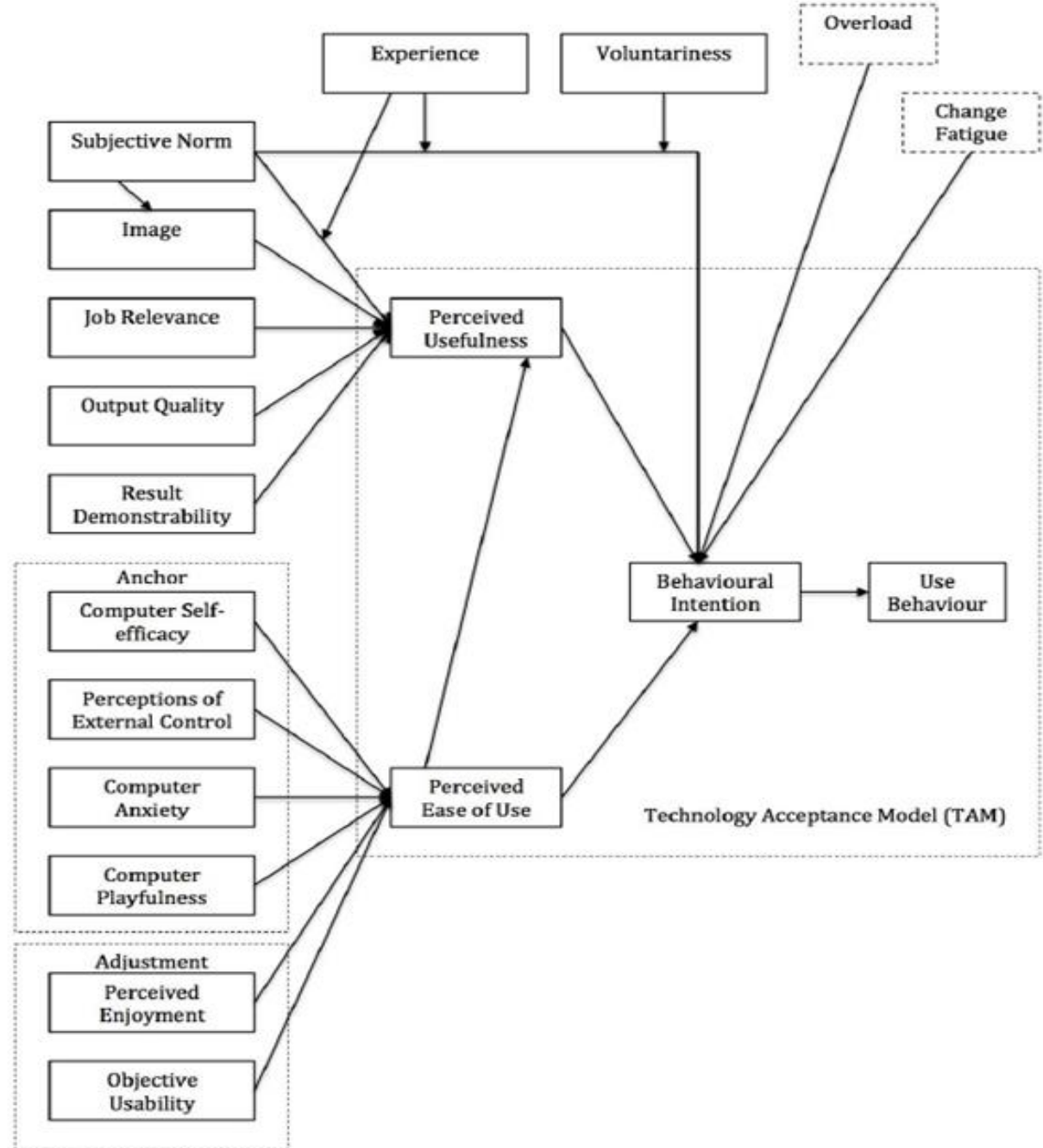


Figure 10 TAM3 by Venkatesh and Bala (2008)

Case 3 research method:

Survey online using SurveyMonkey

The 7-point Likert scale used with ALL but two of the questions were: 1 (*strongly disagree*), 2 (*moderately disagree*), 3 (*somewhat disagree*), 4 (*neutral*), 5 (*somewhat agree*), 6 (*moderately agree*), and 7 (*strongly agree*).

1. I use *Canvas* to integrate sharing of content and/or class documents into my class.
2. I use *Canvas* to integrate the use of the calendar function into my class instruction and course management.
3. I use *Canvas* to integrate the use of the grade book into my class instruction and course management.
4. I use *Canvas* to integrate the use of the quiz tool into my class instruction and course management.
5. I use *Canvas* to integrate the use of the test administration function into my class instruction and course management.
6. I use *Canvas* to integrate the use of message boards into my class instruction and course management.

Applicability of TAM

TAM compared favorably with TPB in parsimonious capability. It provides a quick, relatively easy, and inexpensive way of conducting research on **users' post-adoption behavior**.

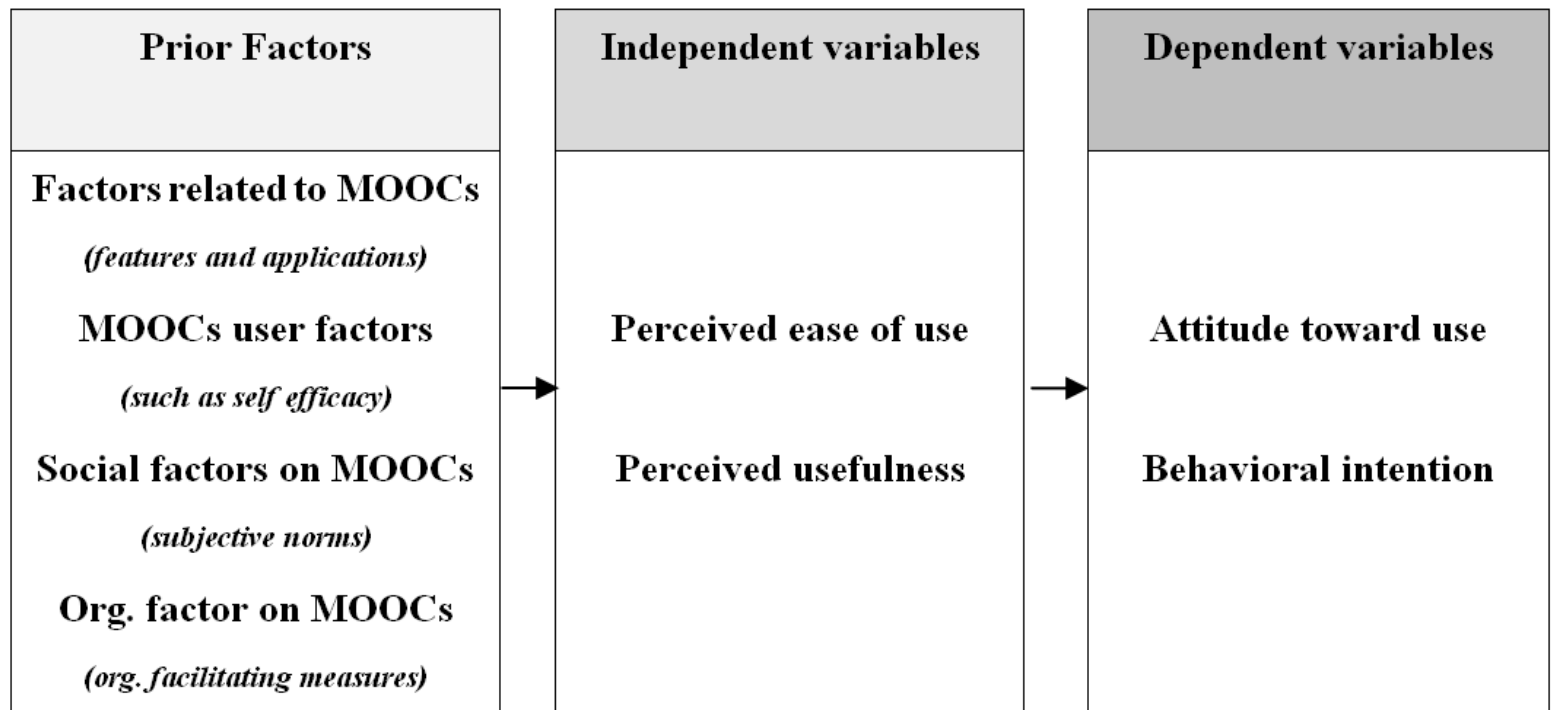


Figure 16: A summary of TAM factors

The Unified Theory of Acceptance and Use of Technology (UTAUT)

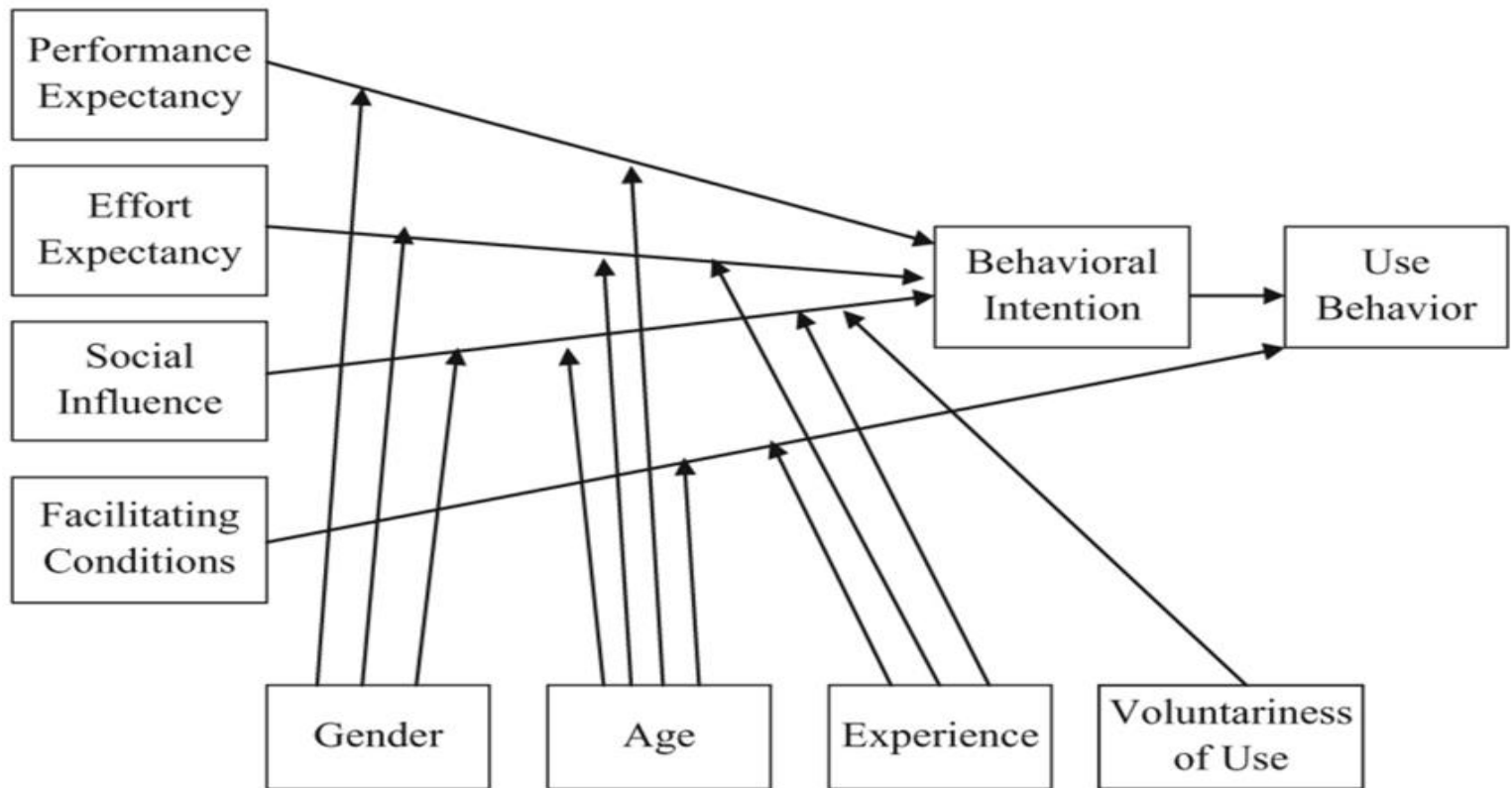
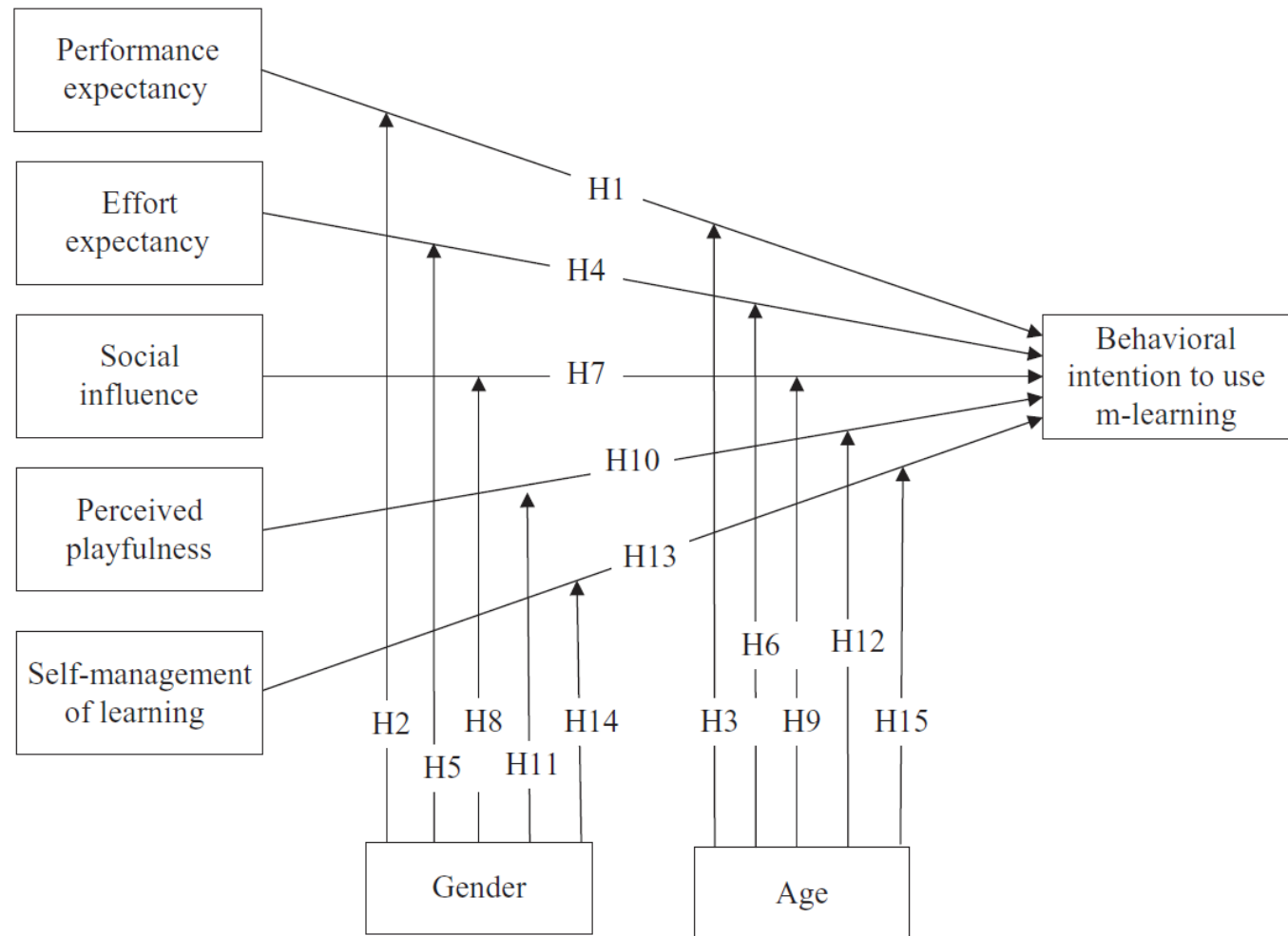


Figure 12 UTAUT

Example: framework adapted from UTAUT





Research method: survey

Appendix: original survey items used in the study

Performance expectancy

PE1: I would find m-learning useful in my learning.

PE2: Using m-learning enables me to accomplish learning activities more quickly.

PE3: Using m-learning increases my learning productivity.

PE4: If I use m-learning, I will increase my chances of getting a promotion.

Effort expectancy

EE1: My interaction with m-learning would be clear and understandable.

EE2: It would be easy for me to become skilful at using m-learning.

EE3: I would find m-learning easy to use.

EE4: Learning to operate m-learning is easy for me.

Social influence

SI1: People who influence my behaviour will think that I should use m-learning.

SI2: People who are important to me will think that I should use m-learning.

SI3: The seniors in my organisation have been helpful in the use of m-learning.

SI4: In general, my organisation has supported the use of m-learning.

Perceived playfulness

PP1: When using m-learning, I will not realise the time elapsed.

PP2: When using m-learning, I will forget the work I must do.

PP3: Using m-learning will give enjoyment to me for my learning.

PP4: Using m-learning will stimulate my curiosity.

PP5: Using m-learning will lead to my exploration.

Self-management of learning

SL1: When it comes to learning and studying, I am a self-directed person.

SL2: In my studies, I am self-disciplined and find it easy to set aside reading and home-work time.

SL3: I am able to manage my study time effectively and easily complete assignments on time.

SL4: In my studies, I set goals and have a high degree of initiative.

Applicability of UTAUT

UTAUT is the best fit for studying the MOOCs adoption if **various contextual and objective factors** are to be emphasized and tested.

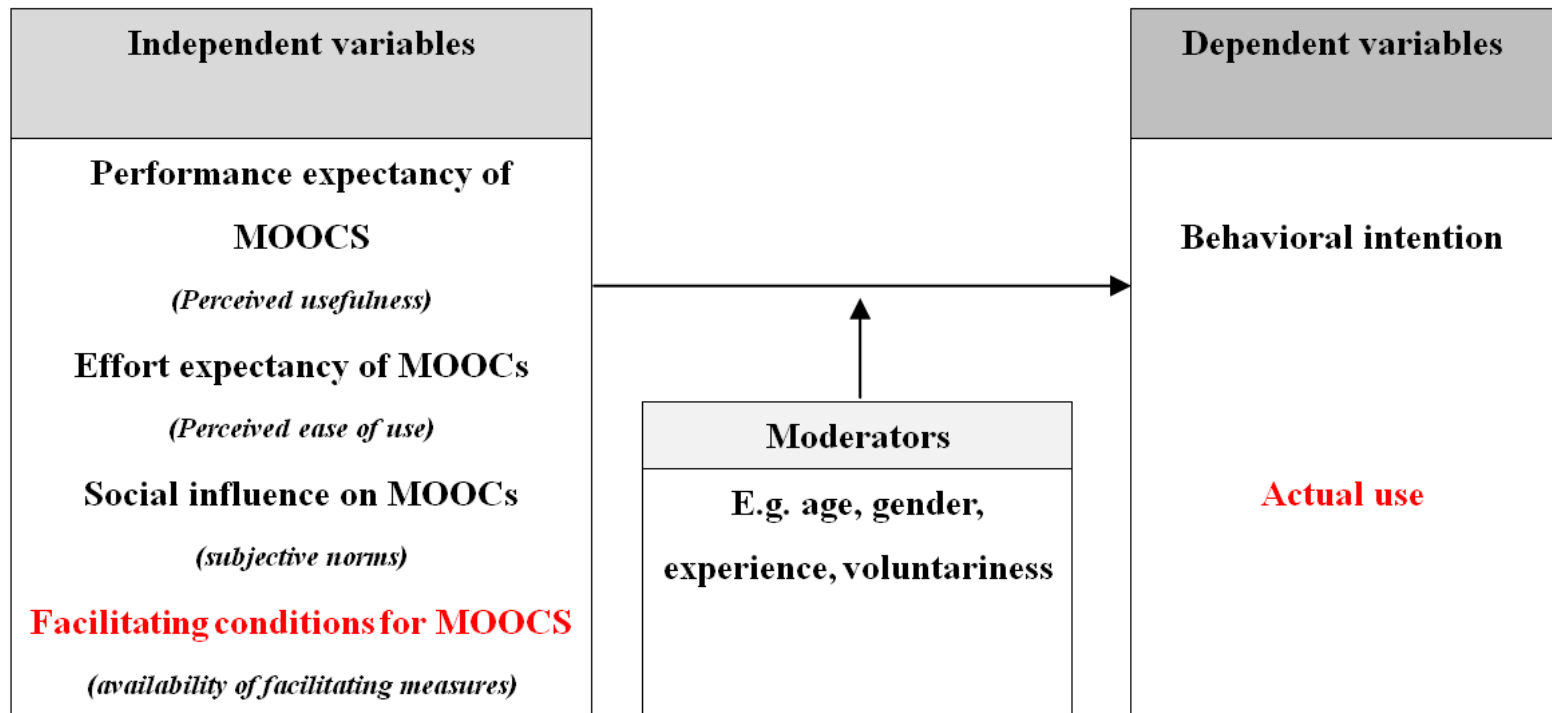


Figure 17: A summary of UTAUT factors

Observations and comments

- Though TPB, TAM and UTAUT are the most popular models in the study of MOOCs user behavior, *few scholars simply adopt these models in their original forms.*
- However, the *additional number of variables can strength the explanatory power* than the original models but at the same time *raises the question of parsimony.*
 - Researchers should think about how to maintain a balance between the added explanatory power and the complexity introduced by the additional variables.

Contributions

- Firstly, it *focuses on the factors affecting the adoption intention*, which is indeed one of the very important elements that determine the scale of adopting MOOCs.
- Secondly, it provides a systematic review of relevant research using *the three major theoretical frameworks and identifies the major constructs* examined by different scholars.
- Thirdly, it serves as *a stock taking of dominant theoretical frameworks and research methods adopted by related studies*. The review may assist or encourage stakeholders such as educational institutions, educators and scholars to further explore the determinants of using MOOCS in the future.

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- Thank you!