



User Perceptions and Purchase Intentions: A Study on Virtual Live-Streamer Impact Mechanisms

Fangdi Qiao*

College of Professional Study, Northeastern University, Boston, MA, 02115, USA

Corresponding author. Email: qfd0712@sina.com

Abstract. This study investigates the impact of perceived usefulness and ease of use of virtual streamers in e-commerce live streaming on purchasing intention. It also explores how users' prior using experiences moderate these relationships. Using a questionnaire survey, the study analyses users' reactions to virtual streamer-driven live sales scenarios. Findings reveal that enhanced perceived usefulness and perceived ease of use positively influence purchasing intention. Users with higher using experience show higher purchasing intention. The study contributes by highlighting the potential of AI in e-commerce live streaming, analysing users' cognitive and emotional experiences, and exploring the role of prior using experiences. Practical implications include theoretical support for virtual streamer-driven e-commerce, expanding existing theories to a new industry, and advancing e-commerce with improved benefits.

Keywords: Virtual Live-streamer, E - Commerce, Perceived Ease of Use, Perceived Usefulness, Purchase Intention.

1 Introduction

In 1989, Davis proposed the Technology Acceptance Model (TAM) to explore factors influencing user behaviour from an information technology perspective, which significantly impacted subsequent research on IT adoption. This model encompasses two key extrinsic motivations: Perceived Usefulness and Perceived Ease of Use. TAM has since been widely applied across various sectors of the internet industry to predict user usage intentions. The initial aim of introducing the Technology Acceptance Model was to elucidate the determining factors for the widespread acceptance of computers. The advent of short-video platforms has ushered the internet industry into a new phase. Short-video platforms offer diverse content, low entry barriers, and cost-efficiency, resulting in stronger user engagement and wider user groups than other platforms. CNNIC's December 2021 statistics revealed around 460 million users engaged in live-streaming in China. Meanwhile, driven by AI technology, virtual e-commerce streamers have emerged as a new trend due to rising labour and time costs. In this commercial context, the correlation and mechanisms influencing purchasing intentions through virtual streamer live broadcasts have become an emerging field of academic research.

© The Author(s) 2025

P. Dou and K. Zhang (eds.), *Proceedings of the 2024 2nd International Conference on Economic Management, Financial Innovation and Public Service (EMFIPS 2024)*, Advances in Economics, Business and Management Research 327,

https://doi.org/10.2991/978-94-6463-706-9_9

This study carries theoretical significance. Firstly, it discusses the mechanism between established theories of perceived usefulness and perceived ease of use from the field of information technology on purchasing intention, thereby extending their fusion and application into the field of live streaming. Secondly, by focusing on virtual streamers in e-commerce live streaming, this study further expands the key factors influencing purchase behaviour beyond the detailed analyses conducted on the impact mechanisms of online shopping in prior research. Secondly, previous studies have been somewhat confined by their temporal context, failing to address the emerging domain of e-commerce live streaming. In light of the rapid market dominance of electronic commerce as a novel business model, an increasing number of businesses are adopting live streaming to promote sales, resulting in a large and growing user base. This study bridges existing theories with an emerging domain, successfully applying established concepts to a novel business circumstance.

This study holds practical value as well. Firstly, the investigation into mechanisms influencing purchasing intention is a crucial subject in the business domain. Enhancing purchasing intention contributes to increased transaction volume and business profitability, driving overall enterprise growth. Thus, this topic bears considerable importance for corporate development. Secondly, perceived usefulness and perceived ease of use impact users' attitudes and intentions toward product usage, and these factors play a pivotal role in boosting purchasing intention. While scholars have explored the influence of these factors on intention across various sectors of the internet industry, none have yet delved into the current hot trend of virtual live streaming. Consequently, this study extends the potential application of previous research findings to an emerging business sector. Thirdly, the fusion of Artificial Intelligence (AI) with the flourishing field of e-commerce live streaming presents distinct advantages over traditional live streaming with human streamers. Virtual streamers can economize on labour and training costs. Considering the rapid growth of the live streaming industry, professional e-commerce streamers' salaries have escalated substantially, and their training incurs considerable labour and time expenses. Virtual streamers offer a partial solution to alleviate these challenges. This study analyses the practical application of virtual streamers' involvement in e-commerce live streaming from a business perspective, offering insights to relevant enterprises.

Through this investigation, it was found that the perceived usefulness and perceived ease of use of virtual streamers during live broadcasts can influence users' willingness to purchase. The study revealed that improvements in both aspects have a positive impact on users' purchasing intention. Expressing ideas in easily understandable language and effective advertising copy can enhance people's willingness to buy. Users' prior using experiences in e-commerce live streams moderates these relationships. Compared to users with limited using experience, those with higher experience can derive higher perceived usefulness and perceived ease of use from the performance of virtual streamers, ultimately displaying a higher level of purchasing intention.

The conclusions drawn from this study possess certain innovations: Firstly, the application of artificial intelligence is the future trend of e-commerce live

broadcasting. It is still an emerging field with limited widespread research. The adoption of this technology can enhance merchants' sales efficiency and reduce the cost of human resource, providing customers with different using experiences. This presents significant potential and development opportunities for the e-commerce live broadcasting industry. Secondly, in comparison to other research, this study investigates the moderating effect of users' varying levels of prior using experiences, offering a deeper understanding of how individual differences impact the live experience with virtual streamers and purchasing intention.

2 Literature Review

Fishbein and Ajzen [1] introduced the Theory of Reasoned Action, which delineates how users' attitudes and perceptions influence behaviour. Davis [2] proposed the Technology Acceptance Model (TAM) to explore factors affecting user behaviour from an information technology perspective, which significantly impacted subsequent research on IT adoption. This model incorporates two key extrinsic motivations: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Davis [2] defined these concepts as follows: Perceived Usefulness refers to "the degree to which a user believes that using a specific technology enhances task performance (e.g., online purchase decision-making)"; Perceived Ease of Use refers to "the degree to which a user believes that using a specific technology requires minimal effort." With the evolution of e-commerce, TAM gained popularity in the business domain. Interestingly, researchers have started discovering both "perceived usefulness" and "perceived ease of use" of user's experience. Scholars found that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) influence users' ultimate decisions. In the context of online shopping websites used for purchasing, PU influences usage intention. The quality of online shopping positively affects PEOU, which in turn has a positive impact on PU. PU and PEOU are positively correlated with users' attitudes toward online shopping, thus influencing purchase intention. Additionally, these motivations strongly relate to users' willingness to use mobile payments: higher PU and PEOU lead to greater intention to use mobile payments [3][4][5][6]. With these attributes are more likely to launch emerging technology and notable innovations. However, these findings have not yet extended to the association between Perceived Usefulness, Perceived Ease of Use, and the emerging domain of e-commerce livestreaming.

The exploration of purchase intention originates from the 1960s to 1970s. In 1963, Howard proposed the world's first consumer purchase decision model. Subsequent research built upon this model to analyse purchase intention and assess other purchasing attitudes for predicting actual buying behaviour, summarizing their associations. These studies found broad application in various business sectors such as beverages, appliances, and clothing. The key mechanisms influencing purchase intention were also utilized to guide product design for segmented markets [7][8][9]. Morrison [10] presented a theoretical model for the mechanism of purchase intention formation. According to this model, Stated Intention leads to the assessment of True

Intention through the True Intention Model (TIM). The assessed True Intention is then transformed into Unadjusted Purchase Probability via the Exogenous Event Model (EEM). Subsequently, Unadjusted Purchase Probability is calculated into Purchase Probability through the Probability Adjustment Model (PAM). Furthermore, purchase intention is influenced by factors like pricing strategy, brand reputation, interactivity, and perceived product quality. Sensory experiences also significantly impact purchase intention; variables like cleanliness, brightness, layout of the shopping environment (including online), along with the influence of music and colour, all affect consumer purchase intention [11-13]. These findings provide novel insights and important guidance for this study.

3 Main Research Content and Objectives

3.1 Research Objectives

The primary objective of this study is to investigate the impact of perceived usefulness and perceived ease of use of virtual streamers in e-commerce live streaming on purchasing intention. Additionally, the study aims to explore how users' prior using experiences moderate these relationships.

3.2 Research Content

This study employs a questionnaire survey to collect data, evaluating respondents' reactions in scenarios involving virtual streamer-driven live sales. Initially, the investigation selects two types of virtual streamer participation in live streaming: entirely virtual streamers and virtual streamers collaborating with human streamers, with survey material gathered through recorded sessions. Subsequently, the questionnaire addresses respondents' purchasing intention, perceptions, and previous using experiences on the live streaming platform.

By assessing participants' perceived usefulness and ease of use of information conveyed by virtual streamers, the study analyses the correlation between virtual streamer participation in e-commerce live streaming and purchasing intention. Additionally, the study examines how the users' prior using experiences on the streaming platform moderates these relationships. Data analysis will uncover empirical findings regarding these relationships and effects, ultimately presenting a concept model that incorporates moderation:

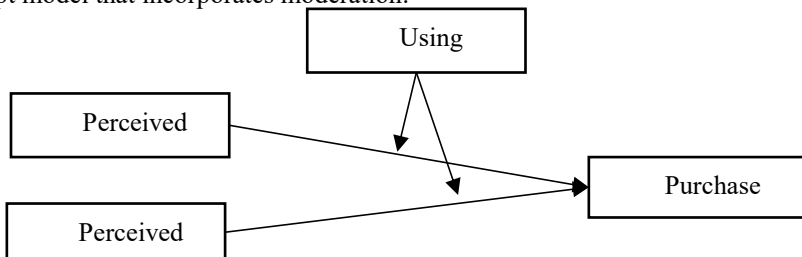


Fig. 1. Concept model

3.2.1. Research Hypotheses.

According to Davis [2], both perceived usefulness and perceived ease of use are cognitive concepts related to technology adoption, playing crucial roles in user experience and the acceptance of new technologies. They both involve users' cognitive perceptions of a system, but from different perspectives. Perceived usefulness focuses on the extent to which a system enhances the user experience, emphasizing whether users believe that using the technology will provide practical benefits, such as improved decision efficiency and enhanced experience. Perceived usefulness centres on the efficacy and practicality of the technology, determining if the new technology (virtual live-streamer) can meet users' needs and offer valuable outcomes. Perceived ease of use concerns the user-friendliness of the technology, emphasizing whether users perceive using the technology as convenient and easy, without requiring significant learning or adaptation efforts. Perceived ease of use addresses the operability and learnability of the technology, whether users, regardless of their technical background, can easily adapt to its usage. While perceived usefulness underscores the benefits users can gain when using a system, perceived ease of use places greater emphasis on the effort and learning costs users need to invest while using the technology.

Perceived usefulness refers to the extent to which users' participation in virtual streamer e-commerce livestreams enhances their efficiency in making purchase decisions. As discussed above, users are more motivated to purchase commodities from virtual live-streamers by high perceived usefulness. This theoretical construct can enhance users' attitudes towards virtual streamers and consequently boost purchase intentions. Informative promotional content aids in increasing purchase intentions. The proposition of this hypothesis is based on the cognitive load theory: individuals have a cognitive load limit when processing information, indicating a restricted amount of information they can simultaneously process and retain [14]. If the information conveyed by e-commerce streamers becomes overly complex or chaotic, it may decrease cognitive efficiency and the efficiency of forming purchase decisions, leading consumers to feel perplexed and reducing purchase intentions. Conversely, easily understandable information delivery can lower cognitive load, thereby increasing the efficiency of forming purchase decisions and consequently stimulating purchase intentions. Hence, the hypothesis is formulated as follows:

Hypothesis 1. There exists a positive correlation between perceived usefulness and users' purchase intentions. The content expressed by virtual streamers that enhances users' efficiency in making purchase decisions leads to higher purchase intentions.

Perceived ease of use, in this study, refers to the convenience with which users receive information and comprehend products during their participation in virtual streamer e-commerce livestreams. An elevation in this factor positively influences users' attitudes towards virtual streamer livestreams and enhances perceived ease of use, thereby elevating purchase intentions. In essence, perceived usefulness not only serves as a cognitive shortcut to assess the value of a product but also sets off an affective loop that can magnify its impact on purchase intention. By igniting positive

emotions, perceived usefulness can enhance consumers' motivation to engage in the behaviour of purchasing, thereby facilitating the conversion from intention to action [1]. Additionally, the information processing theory by Ross and Bettman [15] proposes that when users can rapidly and accurately comprehend the information conveyed by virtual streamers, they find it easier to evaluate and compare products or services, ultimately increasing purchase intentions. Based on these theories and analyses, the hypothesis is posited as follows:

Hypothesis 2. There exists a positive correlation between perceived ease of use and users' purchase intentions. The information conveyed by virtual streamers that is easily comprehensible to users leads to higher purchase intentions.

Users with extensive experience of shopping on e-commerce livestreaming platforms are more familiar with the usage and features of livestreaming, enhancing their efficiency in receiving and comprehending information. Regular users of e-commerce livestreaming platforms can rapidly recognize the streamer's professionalism and the product's appeal, resulting in higher efficiency in forming purchase decisions. However, users with limited experience of shopping on e-commerce livestreaming platforms need to invest more time in learning how to use the platform and understanding its features, leading to lower efficiency in processing received information and forming purchase decisions. Consequently, this diminishes purchase intentions. Agung [16] introduced the involvement theory, suggesting that users with more experience in using social media platforms might exhibit higher levels of attention and engagement with information provided by promoters, thus making it easier for them to comprehend and accept the information. According to the information processing theory, users experienced in using online platforms are more accustomed to the platform's interaction methods and information structure, making it easier to comprehend and accept information, thereby increasing purchase intentions. Therefore, the level of prior using experience on e-commerce livestreaming platforms can influence the impact mechanism between perceived usefulness, perceived ease of use, and purchase intentions. A higher level of prior using experience strengthens the impact mechanism between independent and dependent variables, whereas a lower level of prior using experience weakens this impact mechanism. Based on these analyses and theories, the hypothesis is presented as follows:

Hypothesis 3. Users' prior using experience on livestreaming platforms positively moderates the relationship between perceived usefulness, perceived ease of use, and purchase intentions. The more extensive users' prior using experience on livestreaming platforms, the higher their perceived usefulness and perceived ease of use.

3.2.2. Definition and Measurement of Variables.

Based on the Technology Acceptance Model (TAM) proposed by Davis, F.D. [2], this study takes perceived usefulness and perceived ease of use as independent variables. The measurement of these variables is conducted using a 7-point Likert scale. In the survey questionnaire, respondents are required to rate their subjective perceptions resulting from watching the video content. A score of 1 indicates that the video content is hollow and extremely difficult to comprehend, while a score of 7

signifies that the content is very informative and easily understandable. A higher score indicates a stronger perception of the usefulness and ease of use in information delivery.

The dependent variable in this study is users' purchasing intention generated after watching virtual streamer live broadcasts. The measurement method for this variable also employs a 7-point Likert scale. Respondents rate their purchasing intention based on their perceptions after watching the video content. A score of 1 represents no intention to purchase, while 7 indicates a strong purchasing intention. The higher score indicates stronger purchasing intention among the respondents.

Furthermore, this study includes a moderating variable, which is users' prior using experience on the live streaming platform. This variable is also measured using a 7-point Likert scale, where respondents rate their prior using experience on the platform through self-assessment. The survey's accompanying question for this variable specifies the conditions: respondents need to answer only in relation to their using experiences on the live streaming platform, excluding all other online using experiences. Platforms that do not feature live streaming functionality.

4 Research Method

This study employed a questionnaire survey to gather data and implemented the following control methods: First, respondents were required to watch two selected video excerpts of virtual streamer-driven live streams in their entirety and provide answers based on the questionnaire's set questions. Second, the distribution of the questionnaire was conducted entirely online, utilizing the Tencent Questionnaire for creation and widespread distribution through the deployment tools (Questionnaire link: <https://wj.qq.com/s2/12622638/aa9f/>). Third, the survey was incentivized, and participants who completed the entire questionnaire received compensation from the Tencent Questionnaire platform. Forth, the surveyed population had no specific criteria limitations such as age, industry, or geographic location.

For this distribution, a total of 120 questionnaires were issued, with a plan to collect 60 responses. 61 valid questionnaires were collected, yielding an approximately 51% response rate. The distribution and collection period spanned 2 days, with participants averaging a response time of 2 minutes and 14 seconds. The two video excerpts used in this questionnaire survey were sourced from the two most prominent live streaming platforms in China, namely Douyin and Bilibili.

5 Figures And Tables

5.1 Analysis of Descriptive Statistics

The survey collected a total of 61 responses, meaning that 61 respondents answered all the questions in the survey. Table 1 presents the mean values, standard deviations, and other correlation coefficients of all variables involved in this study. In the questionnaire, the section concerning respondents' personal information (from

question 4 onwards) is coded numerically for ease of analysis. Option a is coded as 1, option b is coded as 2, and so on.

Based on the results, it can be observed that there is a significant positive correlation between users' purchasing intention and perceived usefulness ($r = 0.394$), as well as perceived ease of use ($r = 0.464$), and the users' prior using experiences ($r_{PU} = 0.086$, $r_{PEOU} = 0.136$). These results support the Hypothesis 1, 2, 3, and a regression equation can be proposed:

$$PI = \alpha + \beta_1 PU + \beta_2 PEOU + \beta_3 PUEX + \varepsilon. \quad (1)$$

Table 1. Descriptive statistics and correlations

Variables	Mean	SD	1	2	3	4
1. Purchase Intention	5.09	1.67				
2. Perceived Usefulness	4.94	1.63	0.394**			
3. Perceived Ease of Use	4.99	1.60	0.464**	0.404*		
4. Prior Using Experience	2.96	1.96	-0.009	0.086	0.136	1
5. Gender	1.26	0.44				
6. Age	32.93	5.17				
7. Occupation	3.13	1.52				
8. Monthly Income	2.03	1.21				
9. Educational Background	5.00	1.34				
10. Using Live Streaming (or not)	1.11	0.32				
11. Frequency of Using Live Streaming (per month)	2.30	1.09				
12. Frequency of Purchasing from Live Streaming (per month)	1.46	0.67				
13. Commodity Category Purchased from Live Streaming (mostly)	4.43	3.51				

** The correlation is significant at the 0.01 level (two-tailed).

5.2 Verification of Hypothesis

This study employed SPSS 27 software to conduct statistical validation of the hypotheses. As shown in the results of hierarchical regression in Table 2 (with purchase intention as the outcome variable), perceived usefulness ($\beta= 0.583, p<0.05$) and perceived ease of use ($\beta= 0.263, p<0.05$) were indicated. Therefore, there is a significant impact between the independent variable and dependent variable.

Simultaneously, a hierarchical regression method was used to test the moderating effect of users' prior using experience, with the moderation variable pre-processed through cantering before the test. As demonstrated in Table 2, the correlation of users' prior using experience with perceived usefulness ($\beta= 0.174, p<0.05$) and perceived ease of use ($\beta= 0.210, p<0.05$) was significant. It implies that users' prior using experience moderates the relationship between perceived usefulness, perceived ease of use, and users' purchasing intention.

Table 2. Results of hierarchical regression analysis

Variables	Model 1 (Coefficient)	Model 2 (P-Value)	Model 3 (Coefficient)	Model 4 (P-Value)
Intercept	1.211	0.009**	0.813	0.048*
Independent Variable				
Perceived Usefulness	0.583	0.003**	0.287	0.045*
Perceived Ease of Use	0.263	0.177	1.267	0.013
Moderating Variable				
Prior Using Experience	-0.134	0.043		
Perceived Usefulness $\times$ Prior Using Experience			0.174	0.034*
Perceived Ease of Use $\times$ Prior Using Experience			0.210	0.041*
R ²	0.668		0.707	
Adjusted R ²	0.650		0.686	

** $p<0.01$, * $p<0.05$

6 Conclusions

In accordance with investigation, it has been observed that the perceived usefulness and perceived ease of use generated by virtual streamers during live broadcasts have an impact on users' purchasing intentions. The study revealed that improvements in both aspects have a positive influence on users' willingness to purchase. Expressing information in easily comprehensible language and effective advertising content tend to enhance individuals' willingness to buy. The degree of users' prior using

experiences in the realm of e-commerce live streaming acts as a moderator in these relationships. In comparison to users with limited using experience, those with a wealthier shopping history can derive higher perceived usefulness and perceived ease of use from virtual streamers' performances, ultimately manifesting a higher level of purchasing intention.

This study offers preliminary insights into how virtual celebrities influence purchase intention but has some limitations. It relies on questionnaire data, potentially introducing recall bias and subjective evaluation. Future work could improve analysis by incorporating experimental designs and actual consumption data. The focus here is mainly on perceived usefulness, ease of use, and prior experience within the context of virtual celebrity livestreaming, overlooking other possible influencing factors. Childers et al. [17] introduced additional factors like presence and entertainment, which together with extrinsic motivation, affect online shopping behaviour. Future research could explore these and other factors like emotions and brand image for a fuller understanding of how virtual celebrities impact purchase intention. The study's limited scope and sample size might also affect its generalizability.

In accordance with the lessons learned from this study, there are several directions for further research. First, enlarging the sample size and scope could improve the research's reliability and generalizability. Future work will include more diverse participants and markets. Second, the study could extend to other virtual celebrity participation types, like co-hosted livestreams, to see if different formats have varying impacts on purchase intention. Third, exploring how virtual celebrities influence purchase intention across product categories is another avenue. Lastly, understanding the interaction between prior user experience and virtual livestream involvement by collecting more detailed data could offer additional insights into the moderating effect of user experience in the context of virtual live streaming.

References

1. Fishbein M., Ajzen I., *Attitude, Intention, and Behavior: An Introduction to Theory and Research*, Addison-Wesley, Reading, MA, 1975.
2. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
3. Karahanna, E., & Straub, D. W. (1999). The psychological origins of perceived usefulness and ease-of-use. *Information & management*, 35(4), 237-250.
4. Gefen, D., & Straub, D. W. (2000). The relative importance of perceived ease of use in IS adoption: A study of e-commerce adoption. *Journal of the association for Information Systems*, 1(1), 8.
5. Ha, S., & Stoel, L. (2009). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of business research*, 62(5), 565-571.
6. Kim, C., Mirusmonov, M., & Lee, I. (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in human behavior*, 26(3), 310-322.
7. Axelrod, J.N. (1968), "Attitude Measures that Predict Purchase," *Journal of Advertising Research*, 8 (March), 3-18.

8. Bass, F.M., E.A. Pessemier, and D.R. Lehmann (1972), "An Experimental Study of the Relationship Between Attitudes, Brand Preferences and Choice," *Behavioral Science*, 17 (November), 532-541.
9. Sewall, A. (1978), "Market Segmentation Based on Ratings of Proposed Product Designs," *Journal of Marketing Research*, 15 (November), 557-564.
10. Morrison, D. G. (1979). Purchase intentions and purchase behavior. *Journal of marketing*, 43(2), 65-74.
11. Chen, S. F. S., Monroe, K. B., & Lou, Y. C. (1998). The effects of framing price promotion messages on consumers' perceptions and purchase intentions. *Journal of retailing*, 74(3), 353-372.
12. Tsiotsou, R. (2006). The role of perceived product quality and overall satisfaction on purchase intentions. *International journal of consumer studies*, 30(2), 207-217.
13. Hussain, R., & Ali, M. (2015). Effect of store atmosphere on consumer purchase intention. *International Journal of Marketing Studies*, 7(2).
14. Tan, Y., Geng, S., Katsumata, S., & Xiong, X. (2021). The effects of ad heuristic and systematic cues on consumer brand awareness and purchase intention: Investigating the bias effect of heuristic information processing. *Journal of Retailing and Consumer Services*, 63, 102696. ISSN 0969-6989.
15. Ross, I., & Bettman, J. R. (1979). An information processing theory of consumer choice. *Journal of Marketing*, 43(3), 124.
16. Agung, M., Rabiatal, W., Pradipta, R., & Wihuda, F. (2022). Examining the effect of halal perceived value and perceived risk on purchase intention: A mediating role of Halal Trust. *Innovative Marketing*, 18(4), 62–73.
17. Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of retailing*, 77(4), 511-535.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

