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Feedback provision of online clothing customisation with NFC labels

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Abstract. The widespread use of online clothing sales is hampered by underdeveloped consumer control methods. The introduction of electronic tags in the design of clothing can provide feedback between the consumer and the manufacturer. The purpose of the study was to create a model of online customisation of clothing with two feedback cycles based on the use of electronic tags and to prove its effectiveness. Research methods included modelling of the customisation process, methods of interviews with clothing manufacturers and questionnaires of potential consumers with further statistical processing of the results. The improved model of clothing customisation was developed and verified. The main blocks of the model are substantiated in the form of the elements "clothing database", "clothing attitude", "clothing adaptation", "clothing production", "clothing sales", "clothing consumer". At the same time, the key was to create a second feedback loop based on the use of electronic tags. Elements of customisation process are described. Model for determining the effectiveness of clothing customisation is developed. It was proved that the use of this model increases the efficiency of online customisation of clothing by 25-35%, increases the number of intentions to participate, purchase clothing and attract other participants by 5-13%. The introduction of electronic tags in the process of online clothing trade will increase efficiency, provide feedback, improve quality and competitiveness

Keywords: Internet trade; electronic tags; selling clothes; product-service system; garment consumer

Introduction

The massive introduction of computer and Internet technologies in the process of developing and selling clothes has determined a number of achievements and problems related to quality, efficiency, and competitiveness. The modern clothing market offers quite a large

volume of products that are largely identical or similar. A certain obstacle to the introduction of Internet technologies in the production and sale of clothes is the presence of a pronounced feedback from the developer – producer – consumer of clothes.

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Steps in the direction of providing such a connection are the developed models of “product –service of clothing”, in which services largely depend on consumption patterns formed in the process of communication between the manufacturer and the consumer (Piontek *et al.*, 2020). The internet customisation model described in the work of T.H. Nobile & L. Cantoni (2023) is more complex. At the same time, digital customisation is able to provide personalisation in the design and manufacture of clothes.

Brands are actively putting digital customisation models into practice. The number of scientific publications devoted to the problems of customisation in fashion is growing every year. One of the important problems in the production of modern clothing is ensuring its personalisation. A study by J. Qian & M. Zhao (2021) analysed methods of intelligent generation and means of virtual display of clothing design. The processes of actual implementation of these methods require further research. The first element of the Internet customisation system, according to most studies involves the formation of a database using innovative tools and existing achievements. The structural elements of constructions of various types of clothing for the purpose of their further customisation are largely considered in a number of publications (Slavinska *et al.*, 2021; 2022). The scientific work of J. Hwang & S.-Y. Youn (2023) investigated the process of product uncertainty during shopping of clothes in the Internet space. Consumers note the importance of communication with sellers, manufacturers, as well as product demonstration. The importance of providing a motivational factor, which is insufficiently reflected in existing models, is noted.

C. Lorenzo-Romero *et al.* (2023) described the process of co-creation in the development and consumption of clothing. Three different segments are proposed: “full co-creator”, “company/brand-oriented co-creator” and “other people-oriented co-creator”, which show three different ways of co-creating with a fashion firm. Such segments determine the direction of improvement of online clothing customisation systems. H.-L. Chan (2016) noted that one of the promising technologies in clothing supply management is the use of electronic labels. Implementation of similar systems is considered for logistics, as well as management of communication with clients. In particular, S.-H. Lee *et al.* (2021) considered the possibility of using electronic labels in an ecological aspect for operational control of the condition of clothing, which can potentially be used in the product-service system.

To a certain extent, electronic devices incorporated in the clothing can provide such feedback. Such devices have not yet been widely adopted. A contradiction arises between the possibility of modern electronic devices to create feedback for clothing consumers,

the requirements for improving the Internet trade in clothing, and the insufficient implementation of new technologies in the real process of clothing customisation. The research hypothesis can be formulated in the fact that the use of electronic labels can significantly increase the efficiency of the online clothing customisation process.

The purpose of the study was to justify the feasibility of implementing feedback tools based on NFC labels.

Materials and Methods

The model of the customisation process includes a number of blocks that define the main processes and events. Block connections can be direct or have the form of loops that define feedback. In the process of the model building, a system of concepts was used based on the analysis of the functioning of the existing customisation system, the shortcomings and prospects for improvement were analysed based on the latest technical achievements that can improve the functioning of the system taking into account feedback. The basis for the research is the model of consumer satisfaction (Fig. 1).

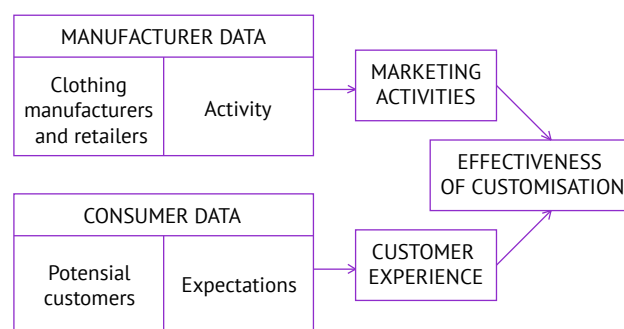


Figure 1. Basic model of the effectiveness of the customisation

Source: based on M. Feori-Payne & E. McKinney (2022)

In this model, the effectiveness of customisation is considered as a set of processes of waiting for customers based on their experience, capabilities, and experience of manufacturers and sellers of clothing with a special emphasis on online trade. Effectiveness is defined as the ratio of expectation and satisfaction when studying the processes of the intention to participate in customisation, the intention to purchase, and the intention to attract other consumers. Modeling the customisation process should include blocks related to garment database, garment relation, garment adaptation, garment production. Blocks must be introduced to provide convenience and satisfaction to consumers, as well as connections between all blocks, including feedback. In the future, the model developed and expanded using methods of analysis of existing blocks and connections,

synthesis of a new model using promising technical and organisational elements, as well as consideration and structuring of factors that affect the effectiveness of the customisation system.

During the research, the consumer audience was segmented, a questionnaire was conducted, the purpose of which was to identify the most important features of the customisation. In the process of processing the data, the results were analysed by factorial analysis and modelling. Identification of the management features of the digital organisation of economic processes is done by means of correlation analysis as well as process rating (Splender *et al.*, 2021). The process of surveying includes 349 consumers and surveying 89 manufactories. The survey process took place during personal interviews, personal questionnaires of consumers, questionnaires on the Internet and through social networks. Questions for consumers predicted definition of weighting factors of abilities to use customisation software. These abilities include: ability to replenish the database, ability to form an image, ability to adapt to individual parameters, ability to influence production, ability to monitor compliance. Questions to manufacturers were related to actual database of elements of clothing, customisation software, means of remote measurement, means of production, means of feedback at stage of implementation.

The questionnaire for consumers consisted of three parts. The purpose of the questionnaire was determined in the introduction, and the essence of customisation was briefly described. The requisite part included such characteristics of the respondent as age, gender, experience in buying clothes on the Internet in general, and participation in the independent design of clothes. In the process of determining the importance parameters, the scale with a range from 1 to 5 was used. After that, a statistical analysis was conducted to determine the average value of importance among all respondents. The Pearson correlation coefficients between different customisation factors were determined separately. The quality and reliability of the selected factors were assessed by determining Cronbach's Alpha for the selected set of parameters, as well as separately for each parameter in order to determine its importance for ensuring the effectiveness of the process.

To determine the effectiveness of creating a second feedback loop using electronic labels, a survey of potential clothing consumers was conducted. The survey was conducted using online personalisation techniques through cloud-based surveys involving

respondents on social media and other possible means. A total of 349 respondents took part in the survey. Segmentation by experience of participation in the process of online personalisation of clothes allowed distinguishing the following groups: consumers without experience – 12%, beginner users – 24%, users with offline shopping experience – 37%, users with online shopping experience – 27%. The questions in the questionnaire related to consumer participation and were formed into five blocks that define the process of clothing customisation. These questions determined the real possibility of consumers participating in the stages with the involvement of modern technical and software tools available to them.

The study of the level of effectiveness of clothing customisation systems by manufacturers was carried out using interviews with managerial and technical specialists, manufacturers, and sellers of clothing. A total of 89 interviews were conducted. Segmentation of these participants identified the following groups: individual order – 27%, mass production – 34%, specialised customisation companies – 11%, internet commerce – 28%. The interview questions were determined by the same blocks that provide customisation. At the same time, emphasis was placed on methods of ensuring efficiency that can be used by manufacturers.

The main parameters of Internet marketing and customer experience in the process of forming a customisation strategy are given in the study of A. Wibowo *et al.* (2021). Similar studies are conducted using media methods and interviews with providers (Piontek *et al.*, 2020). The conceptual basis of the study offers three dimensions: awareness/association, perceived quality, and loyalty. The conceptual framework for dynamic clothing development (Feori-Payne & McKinney, 2022) highlights the importance of conducting in-depth interviews, testing with manufacturers and consumers. The study was conducted in accordance with the norms of The Declaration of Helsinki (2013).

Results

Analysis of the functioning of existing customisation systems demonstrates, a significant drawback of existing online customisation schemes is the lack or weakness of feedback from the client at the last stage of product consumption. It is proposed to introduce additional elements that can increase the efficiency of the process for the existing scheme of Internet customisation. It worth to describe the existing or necessary elements (Fig. 2).

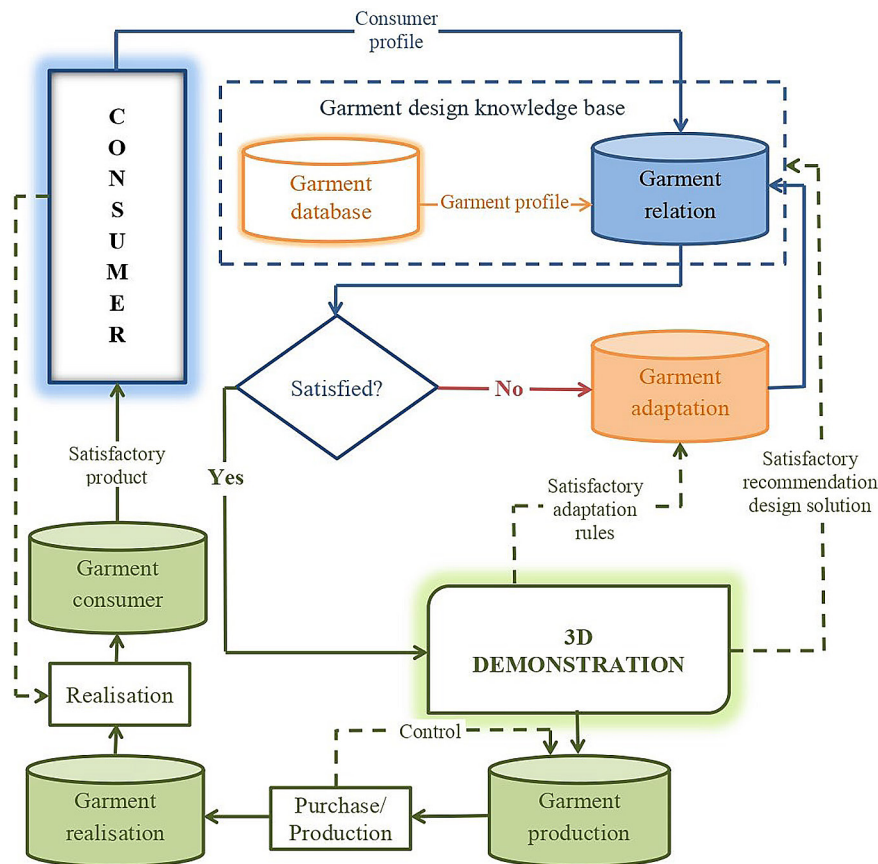


Figure 2. A model of clothing customisation with double-feedback

Source: developed by the authors

The consumer must have access to a database of clothing elements, which has a fairly large volume. At the same time, this volume should not require very high qualifications from consumers. Accordingly, the software must have an interactive block of communication with the consumer to establish a sufficiently stable relationship and have clear access for the consumer.

“Garment database” and “Garment relation” elements are basic for clothing customisation and must be provided with appropriate computer and software. Such elements do not provide feedback and a sufficient degree of proportionality when making clothes in the process of mutual design. Most of the existing customisation schemes involve the use of 3D scanning methods to provide real proportionality and a clear presentation of the created image of clothing on the figure. In this case, the “Garment adaptation” block is added to the system, which ensures that the clothes match the real figure.

This block involves the use of spatial measurement tools and private use or the creation of a network of service points with the possibility of 3D scanning of the human body. It determines the creation of the first feedback loop, which creates conditions for increasing quality and, accordingly, increasing the efficiency of customisation. At the same time, the overall process remains open, as the final stage of consumption remains without feedback.

The next block should be the “Garment production” block. It may not be interesting for the consumer, but it is an important part of ensuring the efficiency of the process. The “Garment realisation” block determines the delivery of the designed and manufactured product to the consumer and involves the use of well-known or advanced e-commerce tools. The usual scheme ends here. In the best-case scenario, customer feedback is provided in the form of a review on the website page.

The use of electronic tags in the design of clothing allows to store, compare, and restore all information

about the clothing produced in the customisation process. At the same time, the consumer gets the opportunity to create continuous online communication during control, operation, and further communication with the manufacturer in automatic mode. The use of electronic labels allows to create a “Garment consumer” block that determines the appearance of a second feedback ring. Such a ring, unlike the first one, completely closes the customisation of clothes, taking into account and ensuring the requirements and interests of the consumer.

Naturally, the interests of the consumer and the manufacturer should be aimed at one goal – improving the quality of service, which determines the increase in the efficiency of customisation. Further, all actions and research were carried out from two points of view. The first took into account the position of producers, and the second – the position of consumers. An updated

structure of Internet customisation with the presence of electronic labels as a carrier of information necessary for feedback at the stage of clothing consumption was proposed for the study. The modern consumer is increasingly responding to individual clothing options. Practically every man's and woman's wardrobe has a shirt of the classic type, or almost close to this style. By applying the principles of customisation, your favourite shirt, like any other type of clothing in your wardrobe, can become personalised. From the fabric to the buttons, the style of the pockets, the collar, the cuffs, the colour of the stitches, and individual details to the smallest details – the entire look is personalised. Figure 3 shows the possible elements of customisation of the male magpie, which can be expanded taking into account innovative technologies (Polishchuk *et al.*, 2023) and technical production possibilities.

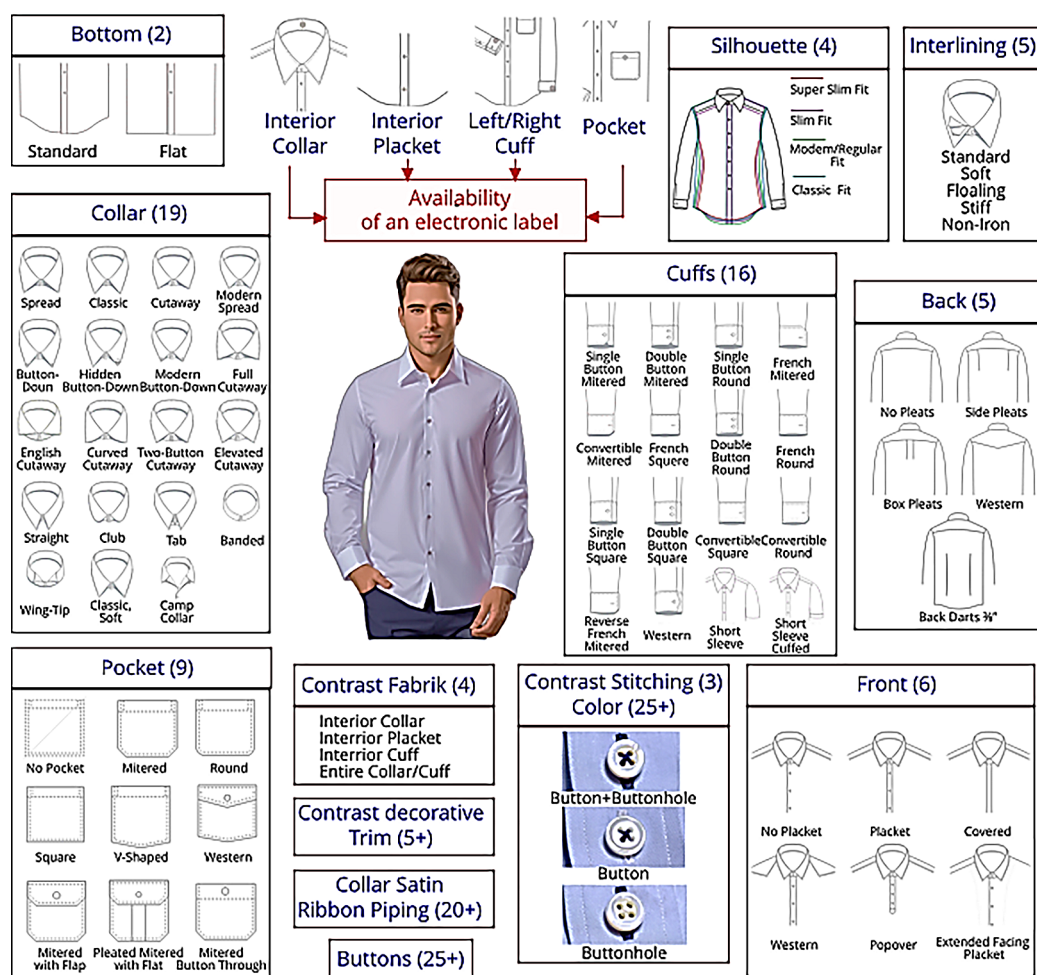


Figure 3. Elements of customisation on the example of a men's shirt

Source: developed by the authors

The detailing of the effectiveness of the elements of customisation of a men's shirt is presented in Table 1

from the position of the manufacturer and the position of the consumer.

Table 1. Detailing the effectiveness of the elements of customisation of a men's shirt from the point of view of the producer and the consumer

The effectiveness of customisation elements	
From the manufacturer's position	From the position of the consumer
The possibility of manufacturing the product according to individual sizes	
• Availability of a large number of standard sizes. • The possibility of making clothes according to individual measurements	• Conformity of the product to body dimensions. • Taking into account the features of the individual figure
Variants of materials by quality, colour, decoration, texture	
The possibility to present a catalog of materials with various sorting parameters (price, colour, pattern, raw material composition, seasonality)	Satisfying personal preferences for every aspect of life
Variants of buttons, variants for stitching, contrasting seams	
The possibility to present a catalog of buttons (threads) with various sorting parameters (price, colour, material, size)	Finishing the product with contrasting seams and stitches to emphasise originality and individuality, personalisation
Choice of silhouette (4 options)	
The possibility of manufacturing products of various styles	Satisfaction of personal preferences in the style, silhouette of the product
Design options: collar (19 options), interlining (5 options); cuff (16 options); pocket (9 options)	
The possibility to satisfy a wide range of consumers	• Correspondence of the collar to features of an individual figure. • Customer satisfaction with large/small wrist cuffs. • Correspondence of the cuff pocket to the designer's idea
Design: front (6 options); back (5 options); bottom (2 options)	
The possibility to satisfy a wide range of consumers in products of various designs	Compliance of the product with the required design, purpose and method of use (fuelled or not)
Availability of an electronic label	
• Establishing direct relations with consumers, understanding their preferences. • Informing consumers about sustainable development initiatives. • Tracking of goods after sale. • Increasing sales and stand out among others	• Access to product information, product origin, and care instruction. • Current information about the product, novelties. • Consumer registration and loyalty program. • Exclusive content is available only to owners of the brand's clothing
Availability of the function of developing one's own design	
Expansion and constant updating of customisation elements	Implementation of own design solutions, creation of a personalised product
Demonstration of a customised product	
The possibility to demonstrate a ready-made selection without the cost of its manufacture	The possibility to see the finished product before making a purchase in different options/angles

Source: developed by the authors

By analogy, any product that a company specialises in manufacturing is broken down into elements with possible options for further customisation. At this stage, the product is fully digital. A new, untested element here is the choice of an electronic tag, including its location, content and amount of information recorded on it. Electronic labels in this sense greatly enrich the process of collaborative design, provided

that there is an online discussion of the information that can be recorded on them for further control and recovery during operation.

The results of the questionnaire and interviews made it possible to significantly improve the model proposed in Figure 1. The improved model, based on the research results, can be described by the diagram shown in Figure 4.

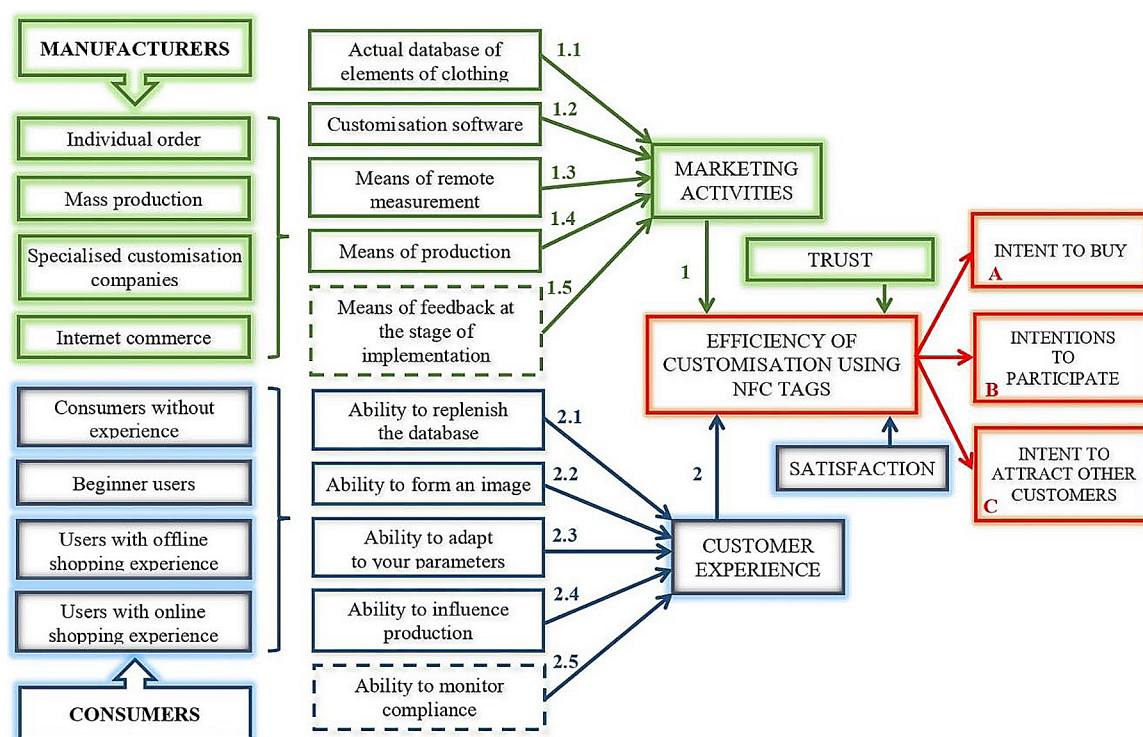


Figure 4. Model for determining the effectiveness of clothing customisation

Source: developed by the authors

The numbers 1.1-1.5 above arrows on the scheme shows the significance of the stages of customisation from the point of view of manufacturers, numbers 2.1-2.5 – the significance from the point of view of consumers. Numbers 1 and 2 are the effectiveness of the customisation process from the point of view of producers and consumers. Letters A, B, C meet the intention to participate, the intention to buy, and the intention to attract others. Prospective blocks for compliance control at the stage of consumption using electronic labels are highlighted with a dashed outline.

A general analysis of the significance of the factors that determine the importance of the blocks presented in the scheme in Figure 2 demonstrate a greater weighting for the stages related to the blocks aimed at controlling consumption. The importance of production processes is of less interest to consumers, while this stage is quite important for manufactories. The stages related to the selection of clothing items and ensuring proportionality is of high importance for both groups. At the same time, the final result, which ensures the

consumer's control over the declared data, is the most important. This block determines the highest levels of correlation with all other processes.

It is worth discussing the results of the study with the help of Table 2 and Table 3. Cronbach's Alpha coefficient was calculated to assess the reliability of the survey and the most complete selection of customisation effectiveness criteria. The high values of this coefficient for producers (0.8491) and for consumers (0.8123) confirm a fairly high level and correct selection of criteria. This number can to some extent determine the level of effectiveness of customisation by the specified means. Analysis of Cronbach's Alpha coefficients for individual indicators indicates a significant impact of final control systems in the form of electronic labels on process efficiency. Thus, the exclusion of these tools leads to a decrease in Cronbach's Alpha coefficient and, accordingly, the effectiveness of customisation to 0.5981 for consumers and 0.6560 for manufacturers. The indicators of other stages are similar, but they do not have such a significant effect.

Table 2. Efficiency coefficients of using electronic labels for feedback based on interviews with producers

Parameter	Relevance	Cronbach's Alpha	Correlation parameter	Pearson's correlation coefficient	Cronbach's Alpha total
1.1	4.29	0.6994	1.2		
			1.3		
			1.4	0.5722	
			1.5	0.7570	

Table 2. Continued

Parameter	Relevance	Cronbach's Alpha	Correlation parameter	Pearson's correlation coefficient	Cronbach's Alpha total
1.2	4.21	0.6783	1.3	0.6945	0.8491
			1.4	0.5950	
			1.5	0.7614	
1.3	4.13	0.7121	1.4	0.6230	
			1.5	0.7881	
1.4	4.38	0.6714	1.5	0.8746	
1.5	4.61	0.6560	-	-	

Source: developed by the authors

The significance of the stage related to production can be discussed separately. This is the second most important indicator of efficiency for manufacturers (in its absence, efficiency decreases to 0.6714). At the same

time, for consumers, the absence of a production stage, on the contrary, increases interest in the customisation process to 0.8644. This fact shows that the production process is not relevant when discussing with the consumer.

Table 3. Efficiency coefficients of using electronic labels for feedback based on consumer surveys

Parameter	Relevance	Cronbach's Alpha	Correlation parameter	Pearson's correlation coefficient	Cronbach's Alpha total
1.1	4.24	0.7773	1.2	0.6758	0.8123
			1.3	0.7123	
			1.4	0.5894	
			1.5	0.9030	
1.2	4.31	0.7496	1.3	0.7243	
			1.4	0.6022	
			1.5	0.8880	
1.3	4.44	0.6790	1.4	0.6237	
			1.5	0.9062	
1.4	3.08	0.8644	1.5	0.8918	
1.5	4.86	0.5981	-	-	

Source: developed by the authors

The results of the research indicate a significant, and to some extent determining, influence of the presence of an electronic label with the possibility of control at

the stage of consumption. The results of the consumer survey regarding the intention to participate in the customisation process are discussed separately (Table 4).

Table 4. The specific weight of the respondents, which determines the levels of participation in the customisation process

Symbol	Intention	Without consumer control through electronic labels	With consumer control through electronic labels
A	Intentions to participate	0.89	0.92
B	Intent to buy	0.48	0.54
C	Intent to attract other customers	0.74	0.84

Source: developed by the authors

All intentions are increased with the use of electronic labels. This fact proves the expediency of introducing additional links into existing customisation systems, which can create additional feedback loops and significantly increase efficiency.

Discussion

Analysis of the existing publications and results shows that the obtained results demonstrate significant advantages and greater efficiency. The study of

A. Wibowo *et al.* (2021) noted the role of social media in apparel distribution strategy. Attention is focused on the compatible role of online marketing tools and customer experience. The opposite movement described above leads to increased efficiency of the process. The need for constant communication in the fashion business is described in a study by L. Cantoni *et al.* (2020) but means of ensuring such communication have been proven fragmentarily. The resulting model provides such communication in a much larger volume.

The technical means of implementing electronic commerce provide communication with the client through the use of 3D technologies in order to obtain a real three-dimensional image of the consumer. The real body model is further used to visualise the image with clothing as described by S. Idrees *et al.* (2023). The results of these studies showed that the implementation of such tools has problems at the stage of consumer use of applications for virtual fitting because the qualifications of consumers are different. There are also problems with the confidentiality of the received information. The developed methods largely solve these problems.

T. Chen & Y. Lu (2022) described the process of designing clothes as a result of customisation, but it is not clear how to control the conformity of the final version of the product in the process of manufacture and sale. In the proposed model, these discrepancies are resolved by additional feedback provided by electronic tags. Z. Dai (2023) claimed that management in the customisation process should take into account all chains, including production. In contrast to his results, the developed model assumes control mechanisms of the final version of the real product are not proven.

The study of S. Guo & C.L. Istook (2022) described the interest of consumers in the process of online design of clothes, but the methods of monitoring the compliance of the final product with the desired result and the satisfaction of consumers with real clothes are not defined. These methods are provided in the developed model.

Provision of the Internet customisation process is described by X. Wang *et al.* (2022) in the form of a system of interconnected models, which include databases, communication models, and data generation models. First-level feedback is provided by virtual fitting effects. Such systems can be considered the closest to implementation. It is desirable to introduce second-level feedback models to them, taking into account positive or negative experience from implemented clothing models. This fact was taken into account during the development of the improved model, which made it possible to increase its efficiency.

A research paper of S. Abdissa *et al.* (2018) evaluated data management processes in the apparel manufacturing industry with database storage of a garment company. In this work, a linear model is proposed, which includes requirements, design, implementation, verification, and maintenance without explicitly expressed feedback. Such approaches should be considered as the first step towards a general product-service scheme management system. The model developed in this article involves a nonlinear approach with feedback, which significantly increases its adequacy.

The goal of the study of Z. Wang *et al.* (2022) was to ensure the gradual optimisation of the design solution through a series of human-machine interactions,

i.e., the repeated execution of the cycle “design generation – virtual garment demonstration – consumer evaluation – adjustment” until the satisfaction of the end user. Such interactions really provide a certain feedback not only on a virtual, but also on a practical level. The new customisation model implements the following directions. Specific examples of the use of electronic tags in fashion clothing companies are given in the study by R. Leitz *et al.* (2018). M. Bertolini *et al.* (2017) conducted a number of test studies on the use of electronic labels in the process of clothing production. At the same time, this study is the first to use electronic labels for the purposes of online commerce.

The use of electronic labels in retail is described in a study by B. Ovezmyradov & H. Kurata (2022). Consumer reactions and parameters of brand costs in the direction of profitability were determined. The introduction of electronic labels into the process of online trade looks like a logical direction for further research. Digital technologies in the fashion industry are in some cases combine with the creation of smart clothes (Riabchykov *et al.*, 2022), while smart approaches are associated with the introduction of electronic labels (Shen *et al.*, 2019). The direction proposed in the study introduces the idea of smart clothes at the stage of implementation with the help of customisation processes.

In known studies, mainly RFID (Radio-frequency Identification) labels are proposed, which require special equipment for their programming and reading. M. Boada *et al.* (2022) noted that the use of cheap and affordable labels allows the use of a smartphone for producer-customer communication purposes. I. Ortiz-Gómez *et al.* (2023) claimed that the development of such NFC tags allows to significantly expanding the scope of their use. This study proved the possibility of using cheap NFC tags to ensure good results of online customisation. Possibilities of preserving the aesthetic properties of clothing during using of electronic tags and other electronic devices are discussed by Y. Liu *et al.* (2020). Design decisions regarding their placement in the stitching process or when using other methods are given in the current study.

N.G.K.K. Reddy & K. Rajeshwari (2017) offered a range of services related to the implementation of electronic labels in clothing. In particular, a system of interactive clothing with the possibility of unique identification is offered, which coincides with the tasks of customising clothes. Such interactive systems create benefits for both manufacturers and consumers; in particular, they can provide advice on the individual use of clothing, and its combination with other clothing elements, materials, and accessories. The propositions provided in the current study envisage the existence of interactive systems that create benefits for both producers and consumers; in particular, they can provide advice on the individual use of clothing, its

combination with other clothing elements, materials and accessories.

As a result of the discussion, a conclusion can be drawn about the relevance of introducing customisation into the process of Internet trade, which requires, in particular, the wide use of digital three-dimensional and other electronic means. The possibilities of solving the issue of control and feedback to the consumer are determined by the presence of electronic labels and their effectiveness.

Conclusions

The feasibility of introducing feedback means into online clothing customisation systems using NFC labels has been proven in this paper. Expanding the functionality of digital tools in the fashion industry creates new opportunities for online clothing customisation. An effective customisation model should include the following blocks and stages: the database block includes basic information about models and clothing elements; the garment relation block determines the direct creation of clothing based on the interactive interaction of the consumer with the software environment; the garment adaptation block defines the first circle of feedback and involves the use of 3D visualisation tools; the garment production block determines the possibility of producing clothes that were designed in interactive mode. This block is more relevant for manufactories. The garment realisation block involves the use of Internet trade tools. The garment consumer block proposed by us defines the possibility of controlling the consumer of clothes created in the customisation process. This unit is based on the use of electronic labels.

The study extended the model of Internet customisation with two feedback loops. The first round involves the coordination of co-dimensionality. Adding

the possibility of feedback using electronic labels based on the results of consumer surveys increases the effectiveness of customisation. At the same time, Cronbach's Alpha according to the results of the consumer survey increases from 0.5981 to 0.8123. According to the results of the manufactories survey, this parameter increases from 0.6560 to 0.8491.

Intentions to take part in the customisation process along with intentions to purchase and attract other participants increase by 5-13%. These facts testify to the importance and relevance of the introduction of the second round of feedback using electronic labels in the Internet customisation system. Limitations of the performed work include the need to take into account the specifics of information on the properties of clothing that can be entered into electronic labels. In particular, personal information about consumers of clothing should be limited. Consumers must have experience in using such labels and in organising feedback in the online customisation process.

Opportunities and perspectives for further research can include NFC technologies, development of new types of NFC tags and labels that can be integrated directly into fabrics or accessories, garment personalisation. Further research is needed in the fields of exploring the ways of how consumers can personalise their garments using NFC. The possibility of marketing and business models determines consideration of perspective business models that may arise from clothing customisation through NFC.

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Conflict of Interest

None.

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Забезпечення зворотного зв'язку для онлайн-кастомізації одягу за допомогою NFC-міток

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Анотація. Широкому використанню онлайн-продажів одягу перешкоджає нерозвиненість методів споживчого контролю. Впровадження електронних міток в конструкцію одягу може забезпечити зворотній зв'язок між споживачем та виробником. Метою дослідження було створення моделі онлайн-кастомізації одягу з двома циклами зворотного зв'язку на основі використання електронних міток та доведення її ефективності. Методи дослідження включали моделювання процесу кастомізації, методи інтерв'ю з виробниками одягу та анкетування потенційних споживачів з подальшою статистичною обробкою результатів. Розроблено та верифіковано удосконалену модель кастомізації одягу. Обґрунтовано основні блоки моделі як елементи «база даних одягу», «ставлення до одягу», «адаптація одягу», «виробництво одягу», «збут одягу», «споживач одягу». При цьому, ключовим було створення другого контуру зворотного зв'язку на основі використання електронних міток. Описано елементи процесу кастомізації. Розроблено модель для визначення ефективності кастомізації одягу. Доведено, що використання цієї моделі підвищує ефективність онлайн-кастомізації одягу на 25-35 %, збільшує кількість намірів взяти участь, придбати одяг та залучити інших учасників на 5-13 %. Впровадження електронних міток в процес онлайн-торгівлі одягом дозволить підвищити ефективність, забезпечити зворотній зв'язок, покращити якість та конкурентоспроможність

Ключові слова: інтернет-торгівля; електронні мітки; продаж одягу; система «продукт-послуга»; споживач одягу