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**DETERMINANTS OF USERS CONTINUOUS USAGE  
INTENTION TOWARDS WEARABLE DEVICES IN TAIYUAN  
CITY, SHANXI PROVINCE, PEOPLES REPUBLIC OF CHINA**

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**UUM**  
Universiti Utara Malaysia

**MASTER OF SCIENCE (MANAGEMENT)  
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**DETERMINANTS OF USERS CONTINUOUS USAGE  
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CITY, SHANXI PROVINCE, PEOPLES REPUBLIC OF CHINA**

**BY**

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**UUM**  
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**A thesis submitted to the Othman Yeop Abdullah Graduate School of Business,  
Universiti Utara Malaysia in fulfillment of the requirement of Master of Science  
(Management)**



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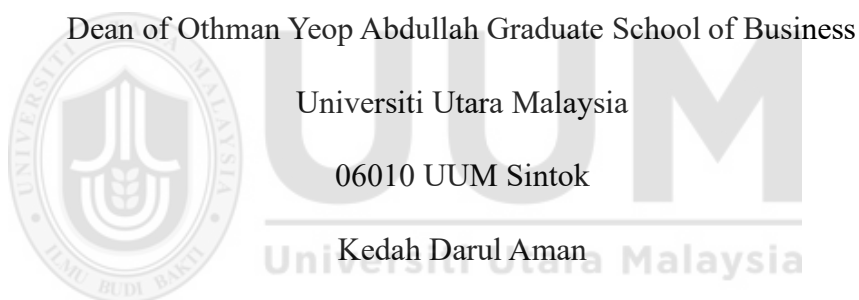
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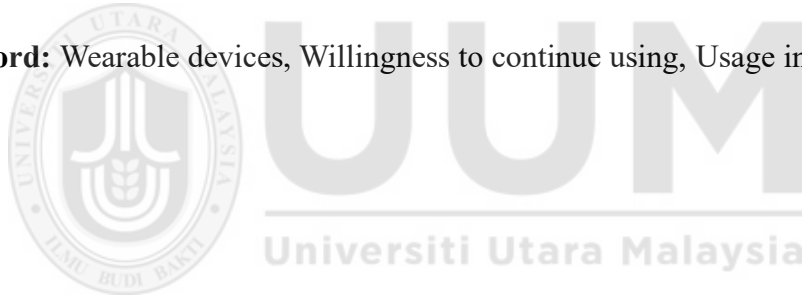
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## ABSTRACT

The rapid development of information technology, computer hardware, and software, and the Internet of Things, a new generation of intelligent wearable devices have been introduced by various manufacturers in an increasingly competitive marketplace. Therefore, to gain competitive advantage and achieve long-term development in the current fierce market competition, device providers should not only consider the initial adoption and purchase intention of users, but more importantly, how to retain customers and improve their willingness to continue using these devices. Based on the above background, this paper presents an empirical study to examine the factors that influence the user's intention to continue the usage of wearable devices. A research framework that combined technology - personal - environment characteristics of the wearable devices and users' intention to continue using these devices are developed. A quantitative method using online survey questionnaires was adopted for this study. The population of the study comprised of users of wearable devices from Taiyuan City, Shanxi Province, Peoples Republic of China. The research results show that the intention to continue using wearable devices among respondents is high. Perceived usefulness, personal reference, and switching costs affect the continuous use of intention among wearables users. Based on the research results, this paper provides management implications for manufacturers and marketers of wearable devices.

**Keyword:** Wearable devices, Willingness to continue using, Usage intention



## ABSTRAK

Pembangunan pesat teknologi maklumat, perkakasan komputer, dan perisian, dan internet perkara, generasi baru peranti boleh pakai pintar telah diperkenalkan oleh pelbagai pengeluar dalam pasaran yang semakin kompetitif. Oleh itu, untuk mendapatkan kelebihan daya saing dan mencapai pembangunan jangka panjang dalam persaingan pasaran sengit semasa, pembekal peranti tidak seharusnya hanya mempertimbangkan penggunaan awal dan pembelian niat pengguna, tetapi yang lebih penting, bagaimana untuk mengekalkan pelanggan dan meningkatkan kesanggupan mereka untuk terus menggunakan peranti ini. Berdasarkan latar belakang di atas, kertas ini membentangkan kajian empirikal untuk memeriksa faktor yang mempengaruhi niat pengguna untuk terus menggunakan peranti yang dapat dipakai. A rangka kerja penyelidikan yang menggabungkan teknologi-sifat-ciri persekitaran peribadi peranti boleh pakai dan niat pengguna untuk terus menggunakan peranti ini dibangunkan. Kaedah kuantitatif menggunakan soal selidik kaji selidik dalam talian telah diterima pakai untuk kajian ini.

Penduduk kajian ini terdiri daripada pengguna peranti yang akan pakai dari bandar Taiyuan, Wilayah Shanxi, Republik Rakyat China. Keputusan penyelidikan menunjukkan bahawa keberkesanan diri, kos penukaran, dan kegunaan yang dilihat telah memberi kesan kepada niat penggunaan berterusan oleh pengguna wearables. Rujukan inovasi dan subjektif juga mempengaruhi niat penggunaan berterusan. Kesan negatif terhadap kebimbangan privasi pada kesanggupan untuk terus menggunakan tidak disokong. Berdasarkan keputusan penyelidikan, kertas ini menyediakan implikasi pengurusan untuk pengilang dan pemasar peranti yang tidak dipakai

**Kata kunci:** peranti boleh pakai, kesediaan untuk terus menggunakan, Niat penggunaan

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

With the continuous development of Information Technology (IT) and computer hardware and software, as well as the miniaturization and integration of various sensor devices, mobile devices have become more and more intelligent from the original single-function communication devices (Dangelico, 2018). Their decreasing cost and functions of mobile devices are changing people's lives in all aspects, and gradually become an indispensable communication, entertainment, and life tool. Smartphones have the market share of the mobile device market. Currently, users are showing a growing interest in wearing a mobile device in their daily activities that can improve the quality of life, a goal that cannot be achieved by smartphones alone. As a result, mobile devices are diversifying into categories other than smartphones. With the penetration rate of smartphones becoming saturated, we are witnessing the birth of a new star in the mobile device market -- wearable devices. In recent years, wearables, as a new generation of portable electronic devices, are rapidly reshaping consumer technology products, thanks to a strong push from the Internet of Things technology (Dehghani, 2016).

From the perspective of different purposes of information in communication activities, smart bracelets, and intelligent clothing products mainly acquire the data of user activities and process the data to a certain extent. Smartwatch products are primarily used for data calculation, which has the function of data collection and calculation

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# APPENDICES

## Appendix A

### A questionnaire on wearable device usage

Dear Sir/Madam:

Hello! Thank you very much for taking 5 minutes to fill out this questionnaire in your spare time. We are conducting an academic survey on wearable device users. To ensure the credibility and validity of the research data, it is hoped that you can answer the questions according to the actual feeling. This questionnaire is for academic use only and will not reveal your personal information. Please rest assured!

Wearable devices are smart hardware devices that combine application software and data interaction to achieve business communication, health monitoring, leisure, and entertainment functions. For example, Apple Watch, Xiao mi band, Samsung Galaxy Gear, Nike smart sneakers, Google glasses, etc.

Q1: Have you ever used a wearable device?

A yes (Continue answering questions) B No (Termination of the answer)

#### Part 1: User profile

Please answer the following questions according to your actual situation.

Q1: Your gender

A. male B. female

Q2: Your age group?

A. Under the age of 18 B. 18-24 C. 25-30 D. 31-40 E. Above 40 years old

Q3: Your employment status

A. students B. Enterprise staff C. Government offices and institutions D. Self-employed person E. Others

Q4: What type of wearable device are you using?

A. apple watch B. Huawei C. Samsung D. others

Q5: How long have you used the device?

A. 1-6-month B. More than half a year C. More than one-year D. Two years or more

## Part 2: User experience of wearable devices

Please choose how much you agree with each of the following descriptions based on the wearable device you are using and your actual feelings.

	1	2	3	4	5	6	7
	Strongly disagree	disagree	Some disagree	general	Some agree	Satisfied	Very Satisfied
<b>The expected degree of confirmation</b>							
Q7 The wearables experience was better than I had expected							
Q8 wearable worked better than I had expected.							
Q9 Overall, my expectations for wearables have been met.							
<b>Perceived usefulness</b>							
Q10 I find wearable devices useful in my work or life							
Q11 Using wearable devices makes my work more efficient or my life more convenient							
Q12 Using wearables allows me to receive and view the information in real-time							



Q13 Using wearables allows me to track my daily activities.							
<b>Satisfaction</b>							
Q14 I'm happy with the whole experience of using wearables.							
Q15 I'm happy with the whole experience of using wearables.							
<b>Self-Efficacy</b>							
Q16 Based on my abilities, I can skillfully use wearable devices							
Q17 Do I know how to use a wearable device without the help of those around me							
Q18 Do I believe I can describe how to use wearables							
<b>Privacy concerns</b>							
Q19 I'm worried that wearables will give away my private data.							

Q20 I am concerned that personal information submitted to wearables could be misused							
Q21 I am concerned that unauthorized persons may access my private information.							
<b>Innovative</b>							
Q22 I was among the early adopters of wearables.							
Q23 I like to try new things.							
Q24 I like to search for information about new products or technologies.							
<b>Personal Reference</b>							
Q25 A lot of people I know are using wearables.							
Q26 People around me think I should keep using wearables.							
<b>Conversion costs</b>							
Q27 It saves time and effort to continue using current wearables							

Q28 The financial cost of switching to another wearable is high.							
Q29 In general, switching to a different wearable is a hassle							
<b>Willingness to continue using</b>							
Q30 If possible, I will continue to use the wearable device.							
Q31 I will be using wearables a lot in the future.							
Q32 I wish I could stick with wearables.							
Q33 I would recommend wearables to others.							

## Appendix B

### Statistics

intentot

N	Valid	117
	Missing	0
Mean		5.2650
Std. Error of Mean		.11275
Std. Deviation		1.21958
Variance		1.487
Skewness		-.959
Std. Error of Skewness		.224
Kurtosis		1.138
Std. Error of Kurtosis		.444
Range		6.00
Minimum		1.00
Maximum		7.00

## Regression

### Descriptive Statistics

	Mean	Std. Deviation	N
intentot	5.2650	1.21958	117
confirmtot	5.1168	1.05710	117
usefultot	5.4231	1.05427	117
sattot	5.4060	1.15582	117
selftot	5.4330	1.09095	117
privacytot	4.7863	1.10681	117
innovativetot	5.0085	1.07163	117
personaltot	5.2778	1.17709	117
costot	5.1225	1.02982	117

## Reliability

Scale: ALL VARIABLES

### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	N of Items
.911	3

### Item Statistics

	Mean	Std. Deviation	N
con1	5.13	1.178	117
con2	5.07	1.089	117
con3	5.15	1.172	117

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
con1	10.22	4.416	.859	.842
con2	10.28	4.894	.826	.872
con3	10.20	4.694	.786	.903

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
15.35	10.057	3.171	3

RELIABILITY

```

/VARIABLES=Q10_A1 Q11_A1 Q12_A1 Q13_A1
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA
/STATISTICS=DESCRIPTIVE SCALE
/SUMMARY=TOTAL.

```

## Reliability

### Scale: ALL VARIABLES

#### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistics

Cronbach's Alpha	N of Items
.885	4

### Item Statistics

	Mean	Std. Deviation	N
usefukness 1	5.36	1.185	117
usefukness 2	5.35	1.275	117
usefukness 3	5.43	1.206	117
usefukness 4	5.56	1.221	117

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
usefukness 1	16.33	11.034	.679	.879
usefukness 2	16.34	9.710	.811	.828
usefukness 3	16.26	10.334	.773	.844
usefukness 4	16.14	10.464	.738	.857

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
21.69	17.784	4.217	4

RELIABILITY

/VARIABLES=Q14\_A1 Q15\_A1

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA



/STATISTICS=DESCRIPTIVE SCALE

/SUMMARY=TOTAL.

## Reliability

Scale: ALL VARIABLES

### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	N of Items
.889	2

### Item Statistics

	Mean	Std. Deviation	N
Q14_A1	5.44	1.206	117
Q15_A1	5.38	1.230	117

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q14_A1	5.38	1.513	.801	.
Q15_A1	5.44	1.455	.801	.

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
10.81	5.344	2.312	2

#### RELIABILITY

```
/VARIABLES=Q16_A1 Q17_A1 Q18_A1
```

```
/SCALE('ALL VARIABLES') ALL
```

```
/MODEL=ALPHA
```

```
/STATISTICS=DESCRIPTIVE SCALE
```

```
/SUMMARY=TOTAL.
```

#### Reliability

**Scale: ALL VARIABLES**

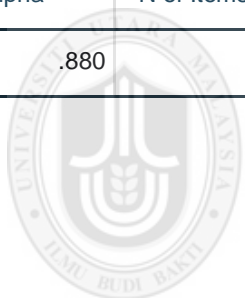
### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	N of Items
.880	3



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### Item Statistics

	Mean	Std. Deviation	N
Q16_A1	5.48	1.142	117
Q17_A1	5.46	1.229	117
Q18_A1	5.36	1.269	117

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q16_A1	10.82	5.407	.754	.846
Q17_A1	10.84	4.982	.770	.830
Q18_A1	10.94	4.746	.787	.815

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.30	10.711	3.273	3

#### RELIABILITY

/VARIABLES=Q19\_A1 Q20\_A1 Q21\_A1

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=DESCRIPTIVE SCALE

/SUMMARY=TOTAL.

### Reliability

#### Scale: ALL VARIABLES

##### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	N of Items
.679	3

### Item Statistics

	Mean	Std. Deviation	N
Q19_A1	5.33	1.196	117
Q20_A1	4.47	1.579	117
Q21_A1	4.56	1.453	117

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q19_A1	9.03	8.215	.201	.879
Q20_A1	9.89	4.427	.618	.400
Q21_A1	9.80	4.418	.736	.224

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
14.36	11.025	3.320	3

RELIABILITY

```

/VARIABLES=Q22_A1 Q23_A1 Q24_A1

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=DESCRIPTIVE SCALE

/SUMMARY=TOTAL.

```

## Reliability

### Scale: ALL VARIABLES

#### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistics

Cronbach's Alpha	N of Items
.655	3

#### Item Statistics

	Mean	Std. Deviation	N
Q22_A1	4.58	1.452	117
Q23_A1	5.56	1.282	117
Q24_A1	4.88	1.439	117

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q22_A1	10.44	5.284	.441	.593
Q23_A1	9.46	6.009	.427	.609
Q24_A1	10.15	4.867	.535	.458

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
15.03	10.336	3.215	3

RELIABILITY

/VARIABLES=Q25\_A1 Q26\_A1

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=DESCRIPTIVE SCALE

/SUMMARY=TOTAL.

## Reliability

### Scale: ALL VARIABLES

#### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistics

Cronbach's Alpha	N of Items
.792	2

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#### Item Statistics

	Mean	Std. Deviation	N
Q25_A1	5.17	1.315	117
Q26_A1	5.38	1.272	117

#### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q25_A1	5.38	1.618	.656	.
Q26_A1	5.17	1.729	.656	.



### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
10.56	5.542	2.354	2

#### RELIABILITY

/VARIABLES=Q27\_A1 Q28\_A1 Q29\_A1

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=DESCRIPTIVE SCALE

/SUMMARY=TOTAL.

#### Reliability

#### Scale: ALL VARIABLES

#### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistics

Cronbach's Alpha	N of Items
.745	3

### Item Statistics

	Mean	Std. Deviation	N
Q27_A1	5.19	1.279	117
Q28_A1	5.27	1.257	117
Q29_A1	4.91	1.259	117

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q27_A1	10.18	4.166	.717	.480
Q28_A1	10.09	4.758	.585	.645
Q29_A1	10.46	5.423	.432	.814

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
15.37	9.545	3.089	3

RELIABILITY

/VARIABLES=Q30\_A1 Q31\_A1 Q32\_A1 Q33\_A1

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=DESCRIPTIVE SCALE

/SUMMARY=TOTAL.

## Reliability

### Scale: ALL VARIABLES

#### Case Processing Summary

		N	%
Cases	Valid	117	100.0
	Excluded <sup>a</sup>	0	.0
	Total	117	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistics

Cronbach's Alpha	N of Items
.945	4

#### Item Statistics

	Mean	Std. Deviation	N
Q30_A1	5.26	1.309	117
Q31_A1	5.26	1.269	117
Q32_A1	5.24	1.324	117
Q33_A1	5.29	1.359	117

#### Item-Total Statistics

Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
----------------------------	--------------------------------	----------------------------------	----------------------------------

Q30_A1	15.79	13.751	.858	.932
Q31_A1	15.79	13.716	.901	.919
Q32_A1	15.82	13.562	.870	.928
Q33_A1	15.77	13.489	.848	.936

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
21.06	23.798	4.878	4



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