



MOBILE APPLICATIONS DRIVE FUTURE NETWORK EVOLUTION



—Consumer Survey Report on Typical Future Mobile Applications

Methodology:

The data of this report is based on the survey conducted by Peking University's Center for Market and Media, Huawei mLab (one division of Huawei Wireless X Labs which is dedicated for research on consumer behavior and scenarios of business to consumer (B2C) applications), and other open 3rd party materials. All the data are surveyed anonymously, and verified by Huawei mLab. Huawei mLab is trying its best of knowledge to justly evaluate and forecast the status and future trends based on its accumulated research experience in the last years. However, it must be pointed out that any data related in this report could be regarded as reference only due to limitation in terms of survey time period, sample numbers, and research capability.



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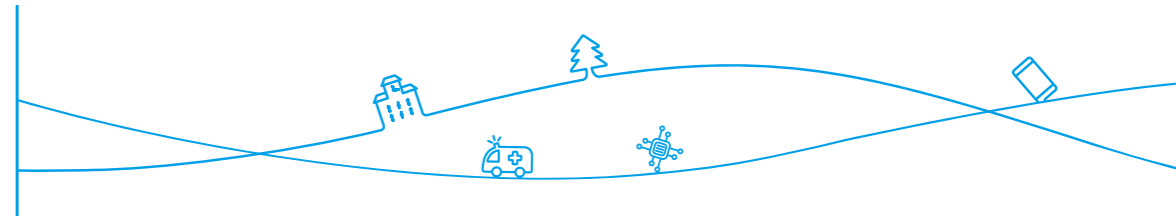
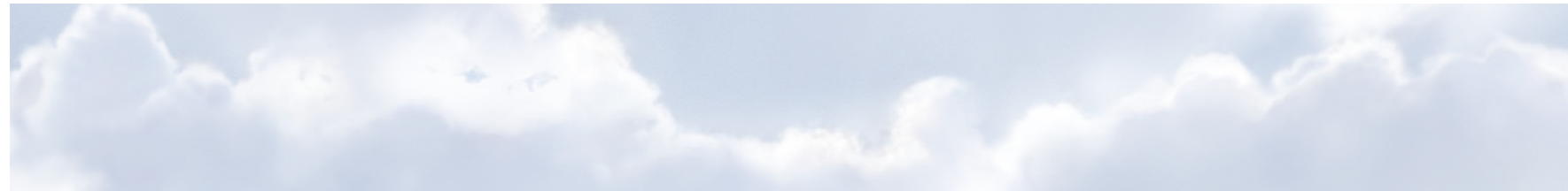


Summary

This report provides an analysis and summary based on a consumer survey conducted on four typical future mobile applications (immersive video, virtual reality (VR), Cellular Internet of Things (CIoT), and tactile Internet) from four representative countries (South Korea, USA, Germany, and UK). This analysis aims to explore consumers' requirements, attitudes, and expectations for 5G-compliant mobile communication applications. The survey results could be used to present supportive data for 5G network deployment and application scenarios from a unique consumer perspective, and provide a convincing reference for future network evolution.

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1 EXECUTIVE SUMMARY

The continuous demand on satisfying new user requirements and better experience provides a fundamental driving force behind mobile network evolution. Each wave of upgrading one new generation mobile network aims to fulfill the emerged new application requirements, which is applicable to future 5G mobile network as well. The implementation of future 5G network and the design principles for adequate business model require a comprehensive understanding of user requirements and a strong grasp of rational forecasts for the future mobile applications.

This survey is conducted on typical future mobile applications (e.g. immersive video, Virtual Reality (VR), Cellular Internet of Things (CIoT) applications, and tactile Internet applications) in four representative countries (South Korea, USA, Germany, and UK). The conclusive evidence provided by this survey aims to explore consumers' requirements, attitudes, and expectations for 5G-compliant mobile communication services. This presents supportive data for 5G network deployment and service scenarios (from a consumer perspective), and provides a convincing reference for future network evolution.

Online surveys are conducted using an Access Panel to select appropriate samples by country and city. As a result, 800 valid samples are selected from each country to represent conditions of each market (3200 samples in total from the four countries). All survey data is quantifiable and is analyzed for statistics to draw invaluable conclusions.

This report includes two chapters: "Typical Future Mobile Applications" and "Mobile Network Evolution". The former chapter includes four sections: "Immersive Video", "VR", "CIoT Applications", and "Tactile Internet Applications".

This survey concludes the following findings and viewpoints:

Firstly, among the four typical mobile applications, VR

achieves the highest level of market visibility (approximately 70%), followed by CIoT applications and immersive video (approximately 25%), and tactile Internet applications (approximately 12%). Notably, from the results it can be deduced that German consumers, out of the four countries, demonstrate the lowest awareness towards future applications.

Second, bandwidth-sensitive applications such as video services become the mainstream trend. CIoT applications that require a high degree of location positioning accuracy and latency-sensitive communication are vitally important. Consumers constantly raise requirement expectations for high-speed and low-latency MBB applications in the following aspects:

- a) Consumers have unprecedented requirements for 100% network coverage, low power consumption, low cost, and high reliability of the most anticipated future applications of CIoT. This survey report shows that consumers expect extensive usage of smart home and Internet of Vehicles (IoV). Smart home is an integral component of our daily lives and is easily popularized with manageable costs. IoV and industrial manufacturing maintain high requirements for high positioning accuracy and low latency to provide real-time communications.
- b) Consumers from the four countries are likely to use immersive video during video playback which is closely followed by gaming and other additional applications. Although immersive video is used more frequently for



video playback than gaming, gaming is more profitable considering the average revenue per user (ARPU). Specifically, over the past year, gaming produces 10% (in the UK), 14% (in the US), 23% (in Germany), and 123% (in South Korea) more ARPU, providing considerably more profits over video playback.

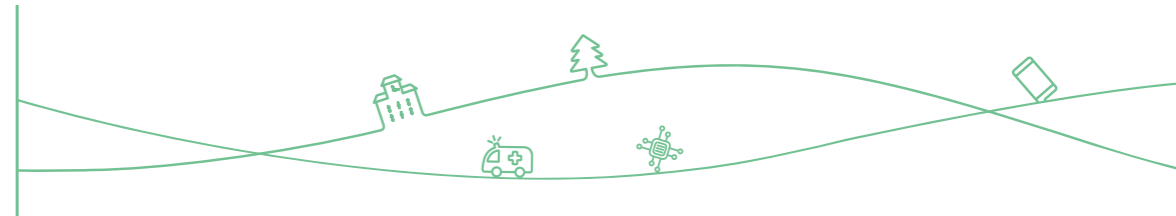
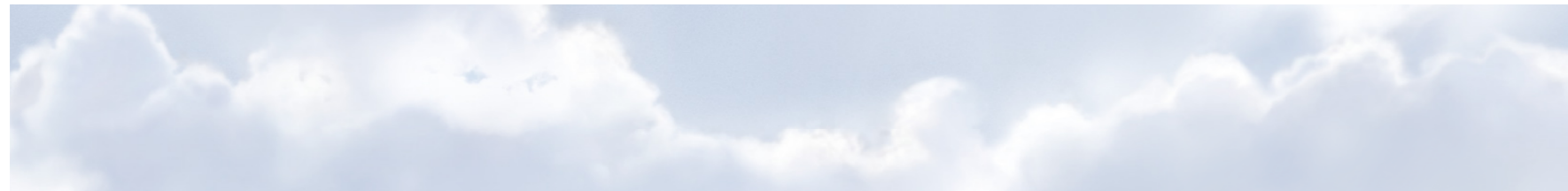
c) Consumers from the four countries recognize VR popularity in gaming and entertainment. As an emerging application, VR is highly anticipated but is still in the early stages of development and lacks maturity, maintaining far less popularity than established CIoT applications. Successful promotion of a new application requires a complete set of industry chain factors. Although a diverse range of VR contents are released, smart devices are insufficiently prepared for a comprehensive popularization of wireless VR in terms of diverse device types and low costs. Mobile transmission for VR applications is yet to meet requirements for large-scale portability and mobile connection, and currently VR is only applicable to indoor experience provision supported by a wired connection.

d) Less than 20% of consumers are aware of tactile Internet applications, representative of three applications: remotely controlled robots to perform dangerous operations, simulated human tactile sense using simulation devices, and remote medical treatment and operations.

Third, consumer groups in each specific country have divergent consumption habits and anticipations, although

their expectation for future applications and overall network development trends is similar. For example, this report indicates that German consumers possess the least awareness of new applications among the four countries. This may be a result from consumption habits and a relatively small quantity of 4G/4.5G mobile subscribers. This report also shows that South Korean consumers have strict requirements for mobile gaming applications in terms of network quality indicators and data consumption per user. Therefore the promotion of emerging applications and new business models should be piloted by the network, and the consumer consumption habits should match to the application awareness when introducing new technologies.

Finally, 58 % of consumers from the four countries consider 5G networks as an indispensable necessity. This indicates high recognition towards 5G benefits and application capabilities in developed countries with advanced mobile networks. Among the six 5G network capabilities, high speeds obtain the highest untapped market index. Based on consumers' expectations for 5G applications, CIoT applications are highly expected over other applications. Tactile Internet is least anticipated of all the market technologies. Besides CIoT applications, South Korean and German consumers most expect 5G-based VR, and US consumers have the highest expectations for a fully immersive video experience.

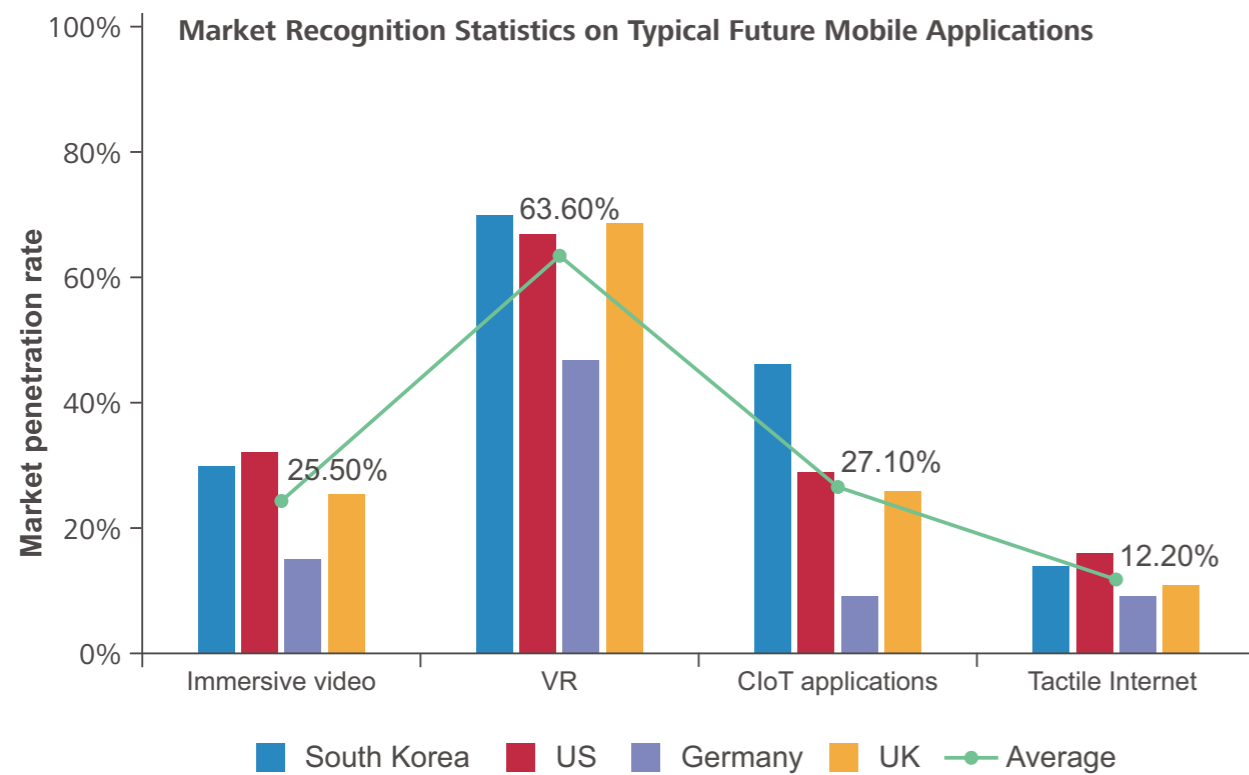


2 HIGHLY EXPECTED TYPICAL MOBILE APPLICATIONS IN THE FUTURE

Constantly growing user requirements have been a key driving force behind mobile network evolution and transition. A comprehensive understanding of user requirements and rational forecasts of mobile application scenarios act as a reference and prerequisite for future network evolution. This survey is carried out on four representative countries (South Korea, USA, Germany, and UK) in terms of typical future mobile applications (immersive video, VR, CIoT, and tactile Internet applications.)

Four recognized mainstream mobile applications are selected to implement a consumer recognition survey. As shown in Figure 1, VR achieves the highest market

visibility among the four typical mobile applications (reaching up to approximately 70%), followed by CIoT and immersive video applications (approximately 25%), and tactile Internet applications (approximately 12%). German consumers possess the least awareness of new applications among the four countries. This may result from a relatively small quantity of 4G/4.5G mobile subscribers. An extensive promotion of emerging applications and recognition of new business models require a constantly improving network. This is combined with the introduction of new technologies and promotion plans for innovative applications, which are quickly adaptable to consumption habits and application awareness.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 1: Market awareness statistics on typical future mobile applications

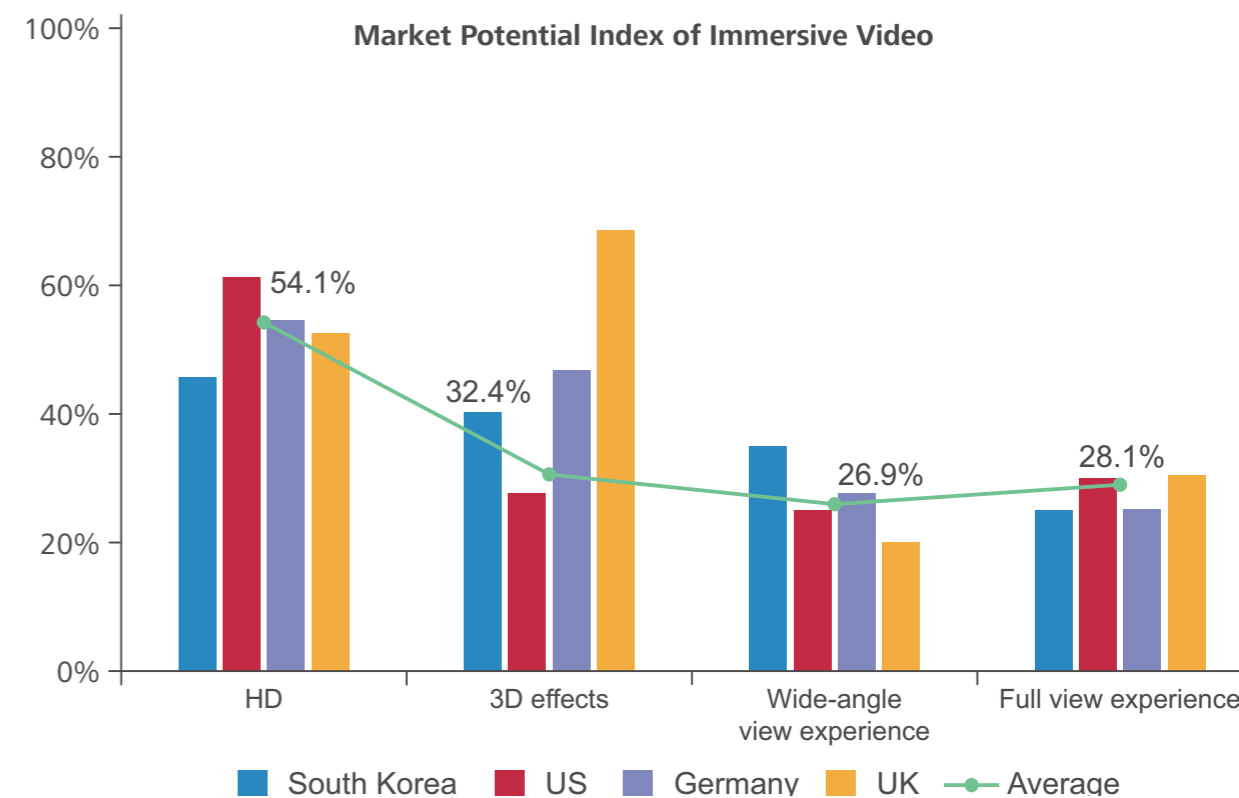
2.1 Immersive Video

Immersive video is the evolved format based on HD video. It brings users a better immersive experience on video by including features of UHD (4K definition and higher), 3D effects, 180 degree or panoramic viewing with six-dimension freedom.

2.1.1 HD Maintains the Highest Market Potential

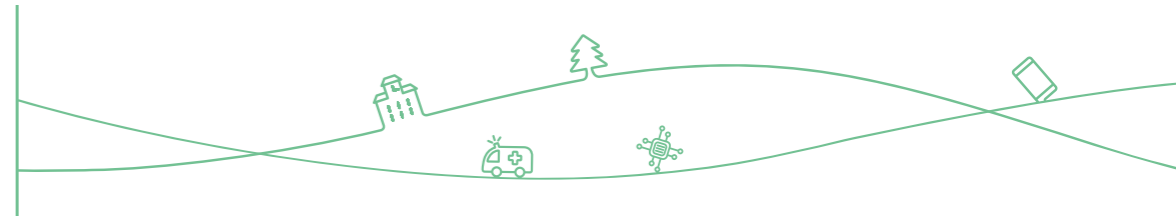
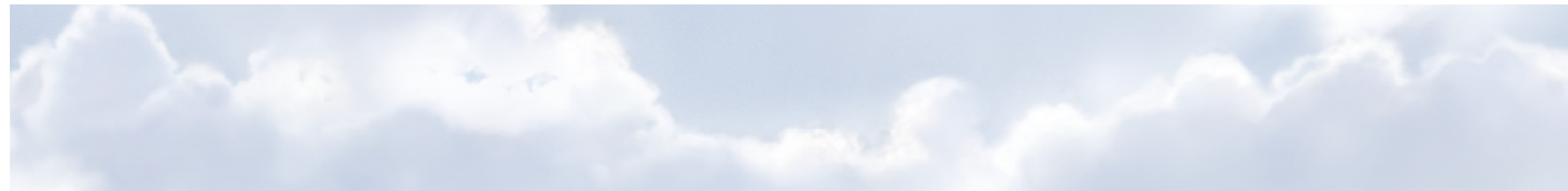
Market potential index is calculated based on concept acceptance and attraction levels in terms of concept

propagation, readability, comprehensibility, and attraction. Figure 2 shows market potential index of different functions on immersive video. The data shows that HD video in the US maintains an evidently high average, reaching up to 54% to achieve the highest market potential index. 3D effects and wide-angle viewing experiences have the highest market potentials in South Korea. This may result from a high level penetration of mobile gaming in this country, while a full view experience has considerable market potentials in the UK.



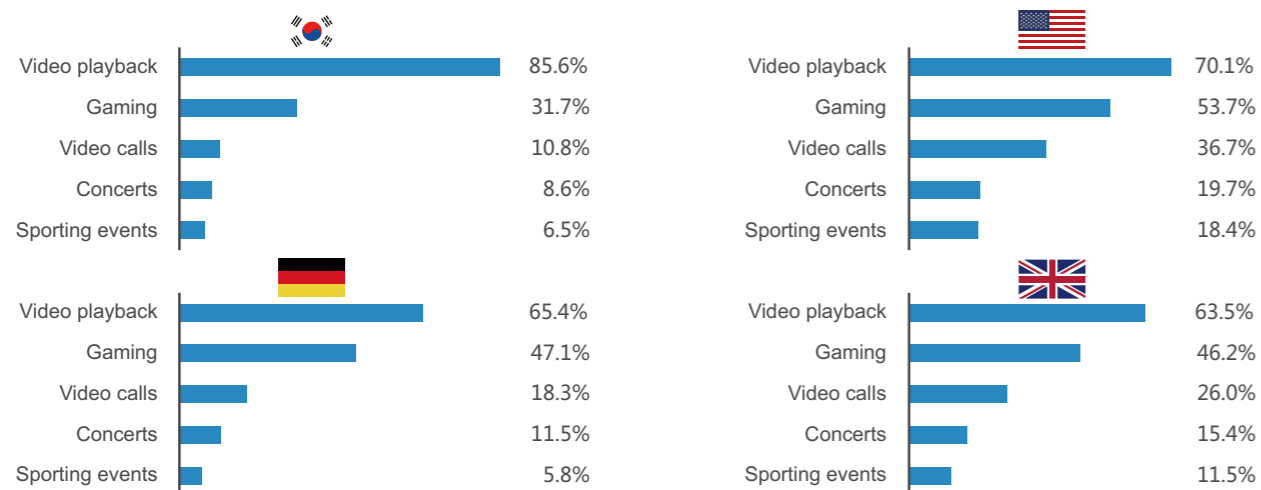
Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 2: Market potential index of immersive video



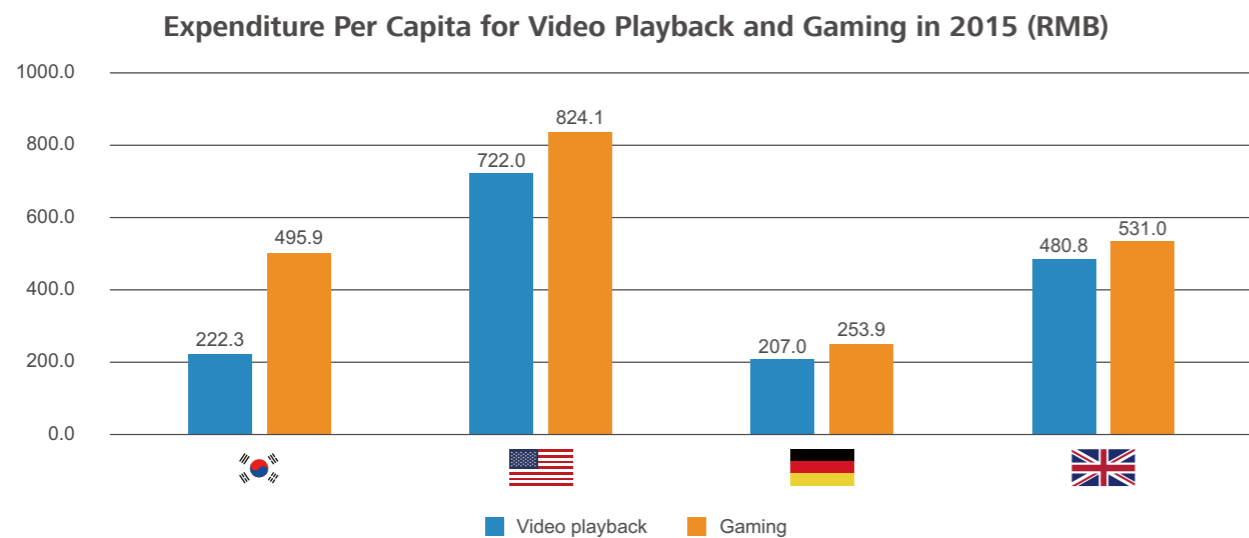
2.1.2 Video Playback Most Frequently Used, Gaming Most Profitable

The consumer preferences on Immersive video application scenarios are similar in different countries. As shown in



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 3: Top 5 application scenarios of immersive video



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 4: Expenditure per capita for video playback and gaming in 2015

Figure 3, video playback and gaming maintain dominant advantages, followed by video calls, live concerts, and sporting events.

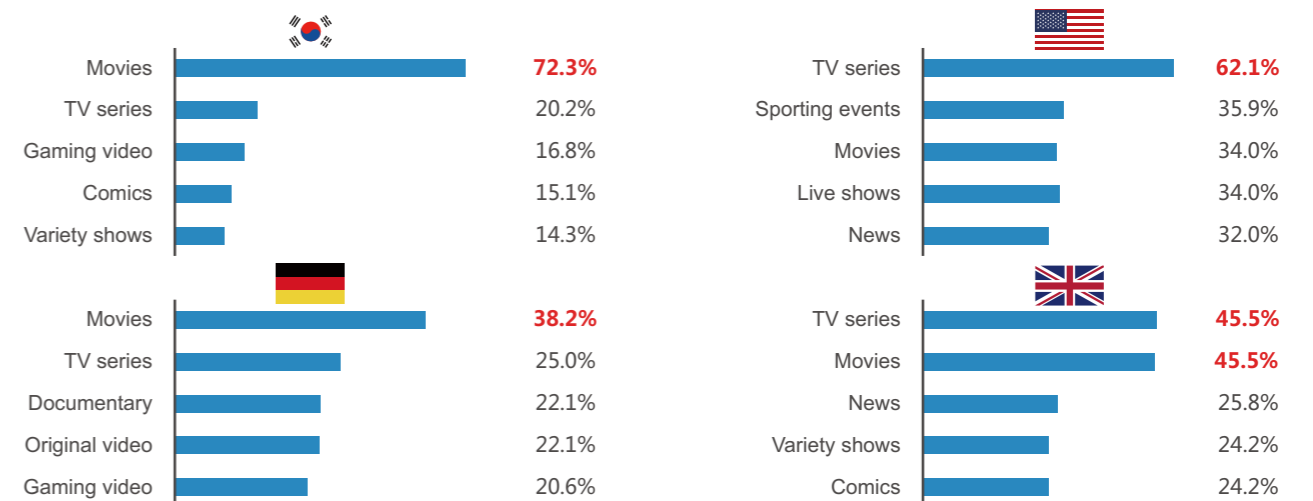
Although immersive video is mainly used for video playback (reaching 60% to 85% in the four countries), followed by gaming (reaching 30% to 55% in the four countries). However, gaming leads to higher average expenditure in comparison to video playback and gains a reputation of the most profitable among all immersive video application

scenarios. As shown in Figure 4, over the past year gaming creates higher profit when compared to video playback (10% UK, 14% US, 23% Germany, and 123% South Korea). As the study suggests South Korean consumers contribute the highest expenditure in mobile gaming.

2.1.3 Movies and TV Series Are Most Favorable

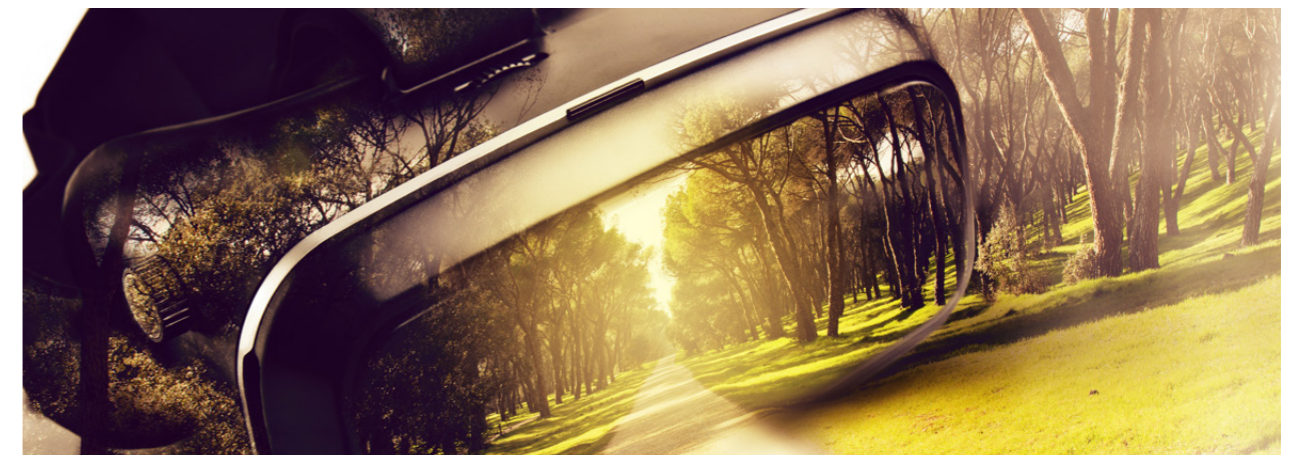
As shown in Figure 5, users from the four countries all prefer to stream immersive video when watching movies and TV series. Movies and TV series rank the top two most viewed content for South Korean, German, and UK

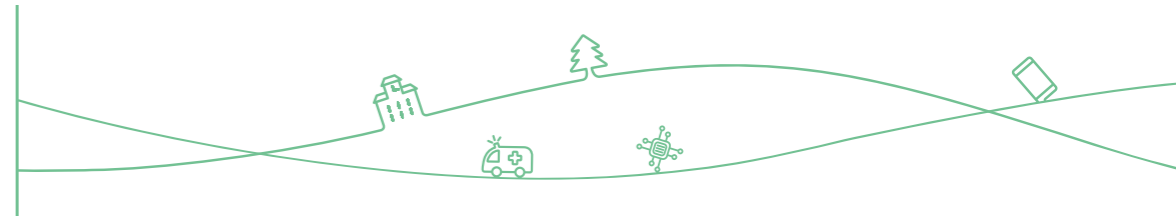
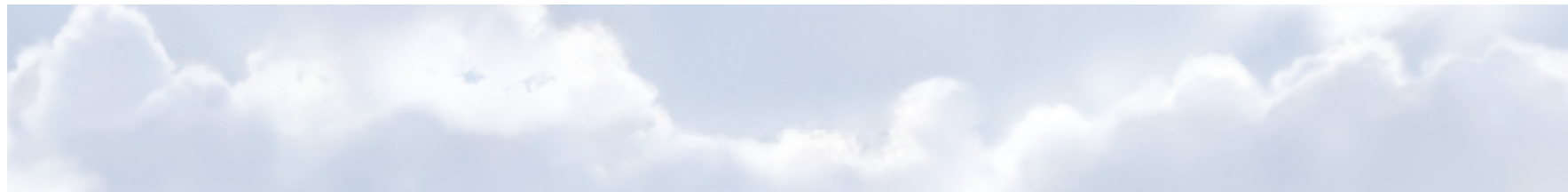
users. However, four countries have divergent preferences towards a vast variety of content types. The data shows that US users prefer watching sport events to movies, with South Korean users favoring gaming video, German users opting for documentaries, and UK users preferring news broadcasts.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 5: Top 5 content types of immersive video

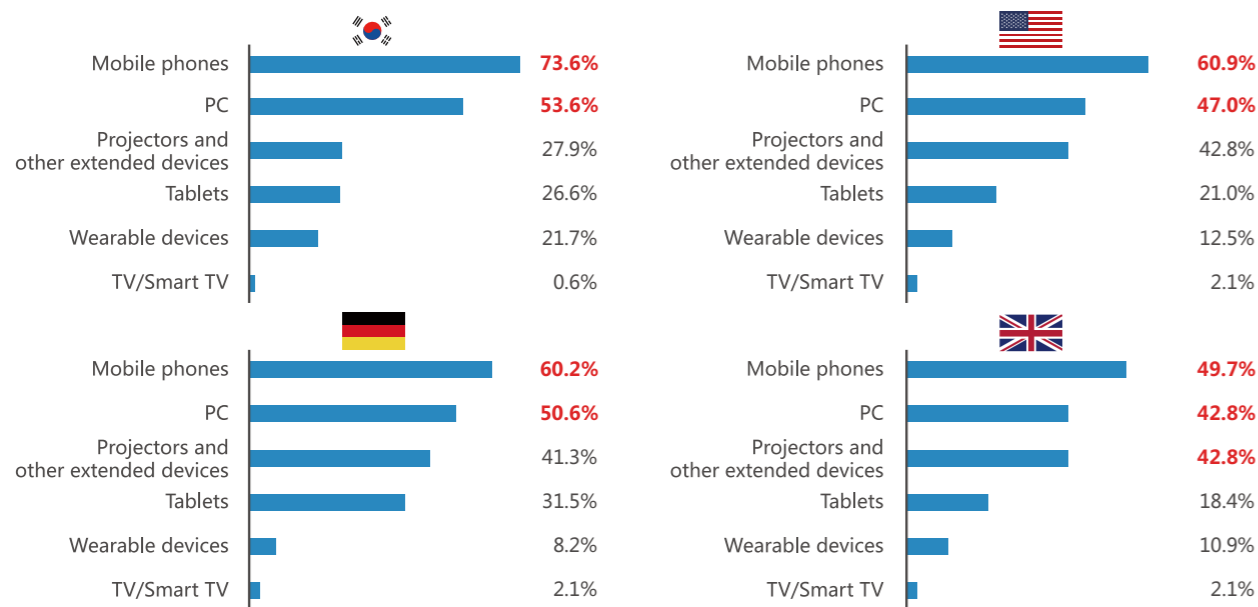




2.1.4 PC and Mobile Phones Are Most Preferred

As shown in Figure 6, personal computers (PCs) and mobile phones are most preferred to stream immersive video, followed by tablets, projectors and extended devices. However, rankings appear slightly different in the four countries. This indicates that satisfaction of display on mobile video terminals requires further improvement.

Mobile phones are advantageously portable, but still require widescreens and HD displays to provide a superior user experience. It is interestingly noticed that German users have a higher expectation for tablets than for mobile phones.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 6: Most preferred terminal types for immersive video

2.2 VR

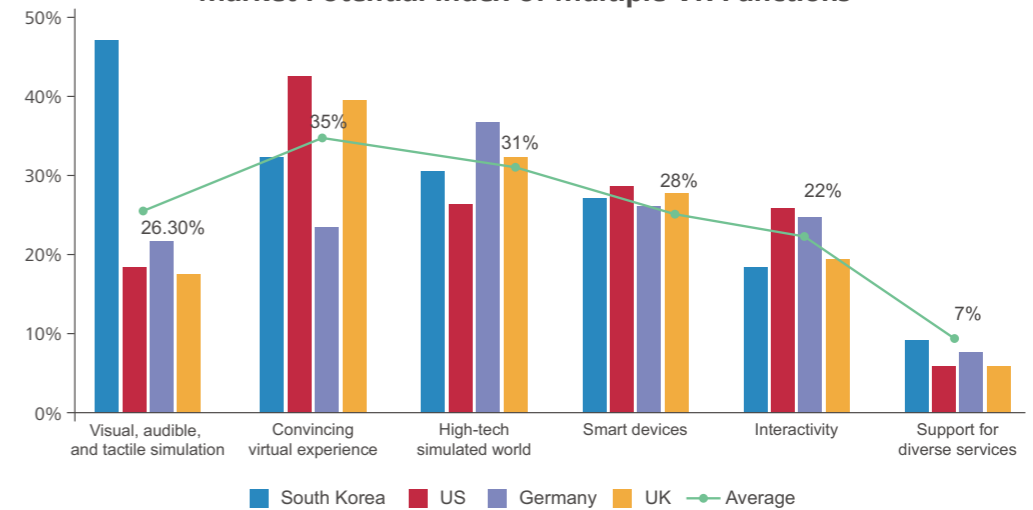
VR generates a highly vivid virtual world utilizing smart devices to provide a completely simulated and visual, audible, and tactile experience. This simulated environment is adept at providing an environment which is indistinguishable from true reality, boasting user interaction with objects presented in the virtual environment, accompanied by bidirectional feedback between users and devices.

2.2.1 Divergent Market Potential of Multiple VR Functions

The market potential survey of VR functions shows that users from the four countries have divergent opinions toward multiple VR functions. As shown in Figure 7,

"convincing virtual existence" ranks the first in the market potential index of VR functions, followed by "high-tech simulated world", "smart devices", "visual, audible, and tactile simulation", "interactivity", etc. The ranking reflects consumers' top requirements for VR. US and UK users have similar preferences and are most concerned about "convincing virtual existence". The data suggests that 46% of South Korean users primarily focus on "visual, audible, and tactile simulation" indicating a high requirement for sensory fidelity. This proportion is far higher than that of users from the other three remaining countries, while German users consider the possibilities of the "high-tech simulated world" with the highest market potential index.

Market Potential Index of Multiple VR Functions



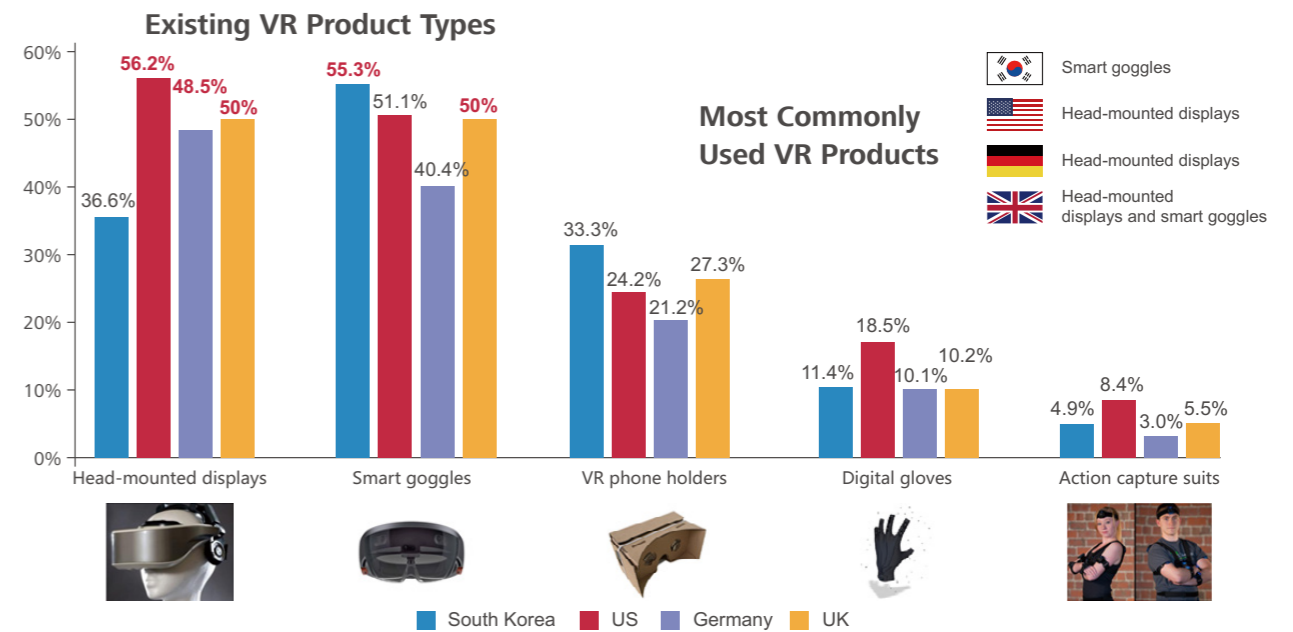
Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 7: Market potential index of multiple VR functions

2.2.2 Head-mounted Displays and Smart Goggles Are Commonly Used Products

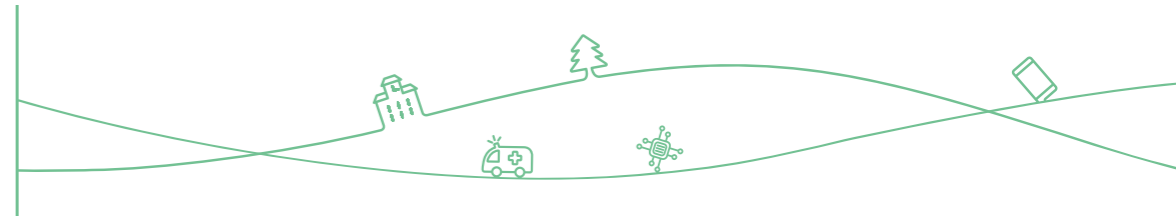
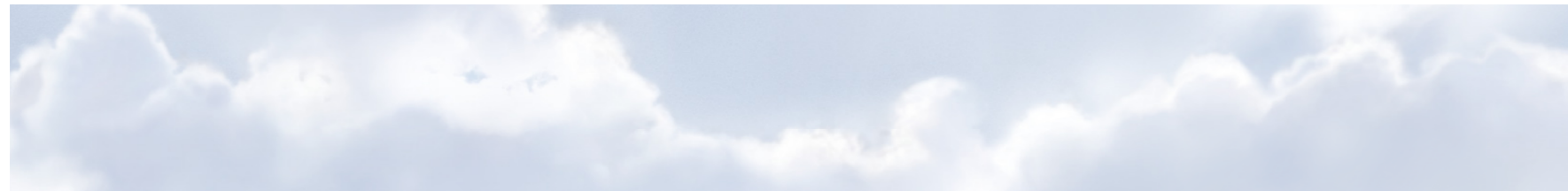
A diversified range of VR products have emerged, such as head-mounted displays, smart goggles, VR phone holders, digital gloves, action capture suits, and so on. Figure 8

shows that head-mounted displays and smart goggles are most widely used and have achieved a penetration rate of nearly 50% in the four countries. These two wearable products have become mainstream hardware products for portability and comfort.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

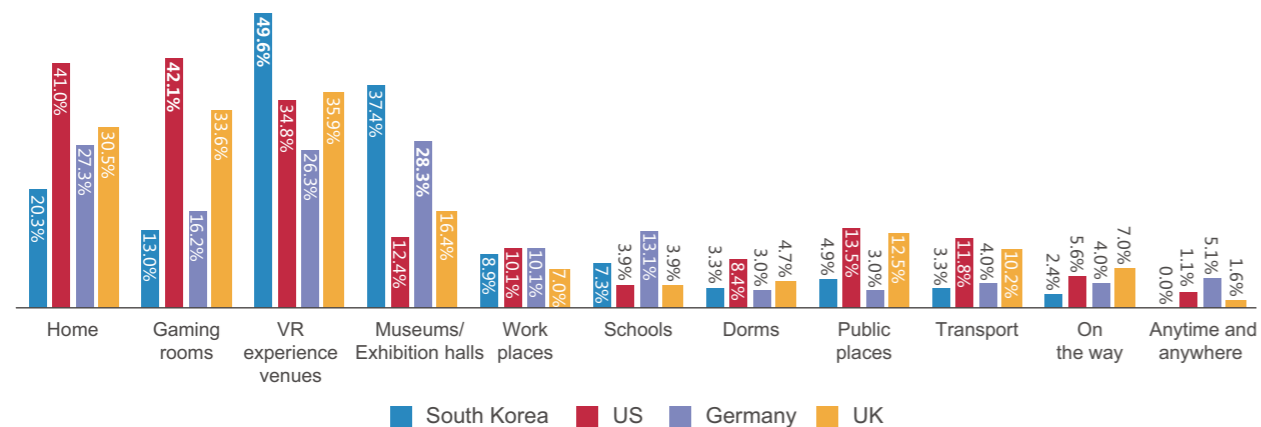
Figure 8: Preference of existing VR product types



2.2.3 Most Commonly Used in Indoor Scenarios

Network connection currently limits VR development and application scenarios. It is most commonly used in indoor scenarios (e.g. VR experience venues, gaming rooms, museums/exhibition halls, and home) equipped with required devices and wired connection. Specifically as shown in Figure 9, South Korean and UK users prefer to

visit VR experience venues. US users are in favor of gaming rooms. German users have a passion for museums/exhibition halls. In addition, South Korean users also like to enjoy a VR experience in museums/exhibition halls, with UK users in favor of gaming rooms, as well as US and German users having a strong preference for home use.

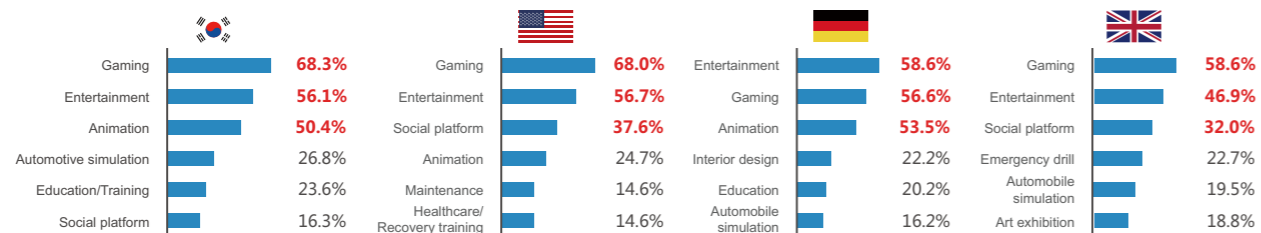


Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 9: VR application scenario distribution

2.2.4 Most Widely Used in Gaming and Entertainment

Figure 10 shows that VR is most widely used in the gaming and entertainment fields. South Korean and German users have a preference for animation, while US and UK users favor social platforms.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

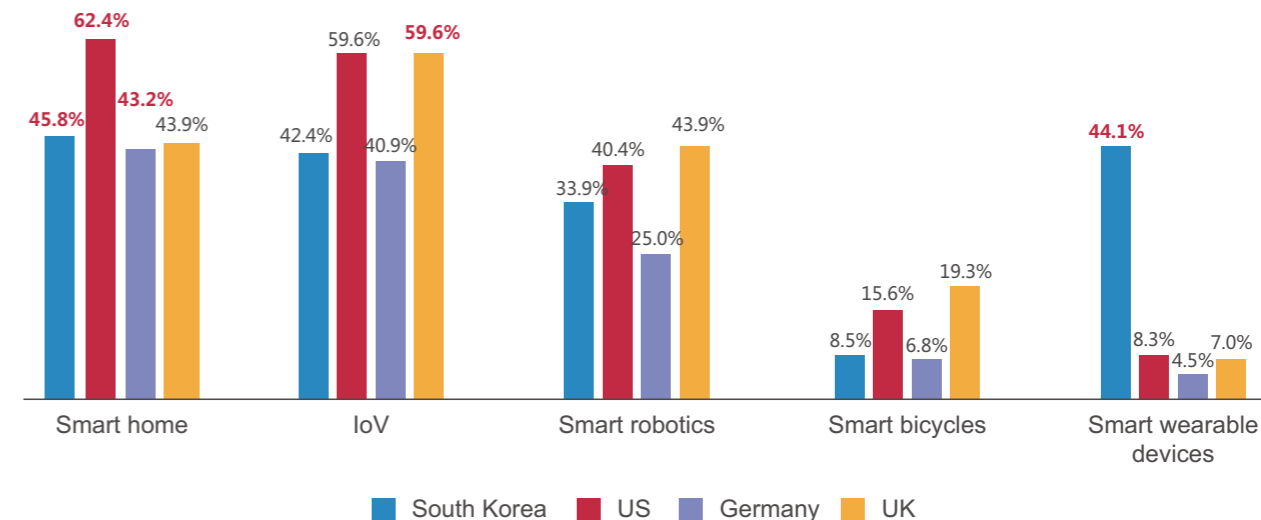
Figure 10: Multiple application fields of VR products

2.3 CIoT Applications

CIoT implements connectivity of everything based on mobile cellular networks. CIoT features ubiquitous network coverage, plug-and-play deployment, low maintenance cost, low hardware cost (several USD or lower), low tariff cost (several USD per month or lower), low power consumption, high network connection reliability, etc. CIoT applications are supported on mobile networks that implement real-time data collection, transmission, and management to implement large-scale connectivity between things.

2.3.1 Smart Home and IoV Are Most Extensively Used

Smart home and IoV are most commonly used among five typical CIoT application scenarios. Four countries have divergent preferences for different application scenarios. As shown in Figure 11, UK users assume a preference for IoV, while South Korean users are more keen and willing for the incorporation of smart wearable devices.



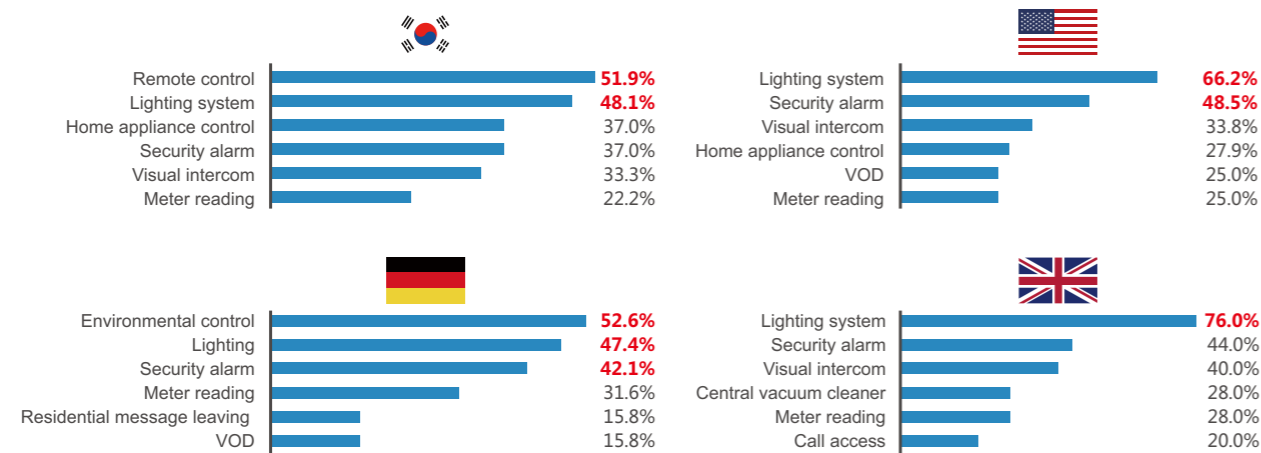
Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 11: Typical CIoT application scenarios



2.3.2 Lighting Systems Are Most Commonly Used in Smart Home Applications

Lighting systems are predominantly used regarding smart home applications especially in the UK and US. Four countries have disparate preferences for different CIoT

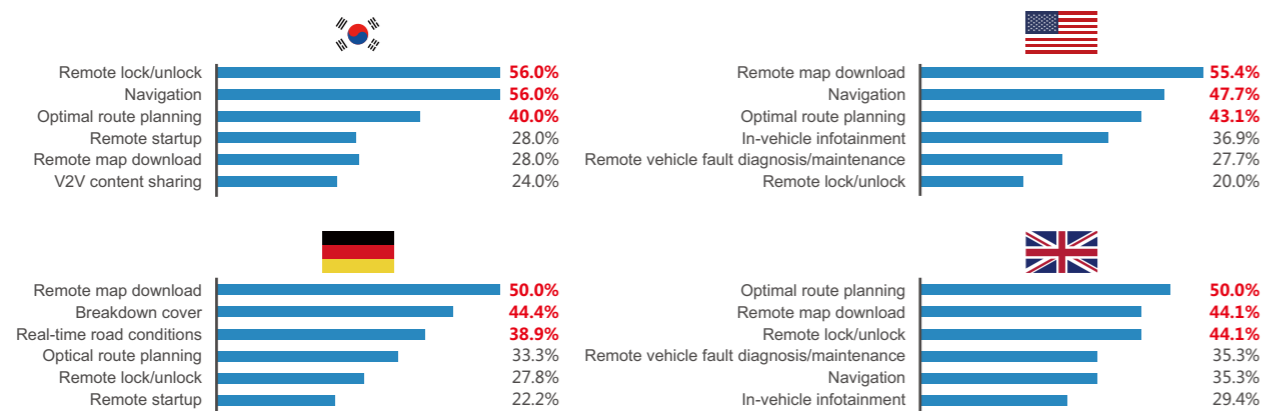


Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 12: Frequently used functions regarding smart home

2.3.3 Route Planning and Navigation Are Most Favorable IoV Applications

Figure 13 indicates that "remote map download", "optimal route planning", and "navigation" are most favorable in



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

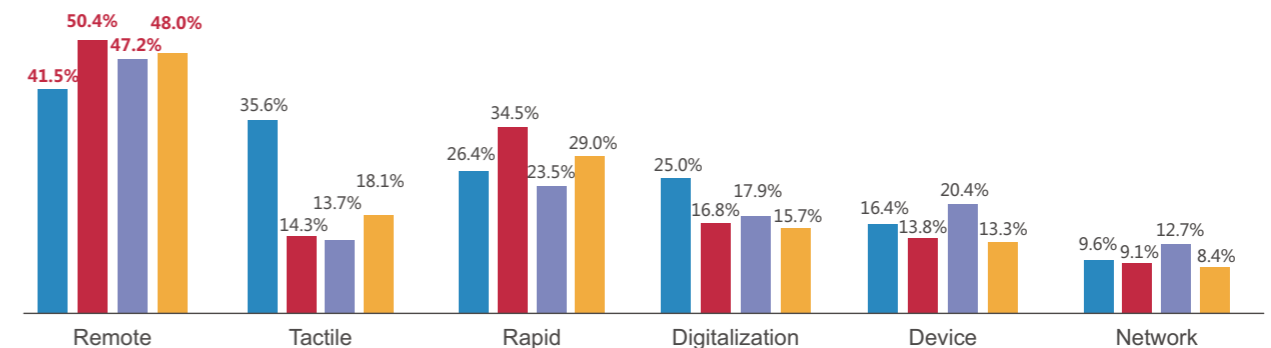
Figure 13: Main functions regarding IoV applications

functions. Figure 12 indicates that South Korean users have a strong predication for remotely controlled device applications, while the US and German users are more concerned about security (alarms), with German users specifically in favor of environmental control applications.

all four countries. However, users have a broad focus on different functional applications. South Korean users and UK users both have an unrelenting interest for "remote lock/unlock", while German users having a preoccupation for "breakdown recovery" and "real-time route planning".

2.4 Tactile Internet Applications

Tactile Internet applications utilize smart devices (gloves) to touch and experience a remote thing. The network accurately transmit real-time experience equivalency to produce human tactile sensory perception. Tactile Internet applications requires the network transmission of digitalized tactile sense to implement ms-level remote tactile experience.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 14: Market potential index of tactile Internet applications

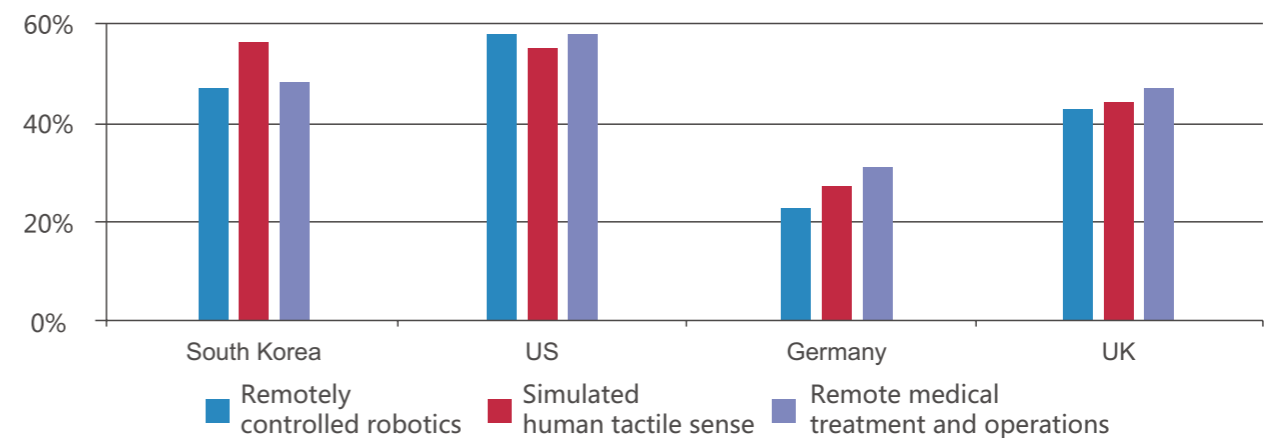
2.4.1 Remote Experience Has the Highest Market Potential

As shown in Figure 14, "remote experience" obtains the highest market potential index in the four countries. South Korean users desire a "remote experience" followed by "tactile experience", while the US, UK, and German users are most attracted by "remote experience" followed by "rapid response".

2.4.2 Remote Medical Treatment and Operations Are Most Anticipated Application Scenarios

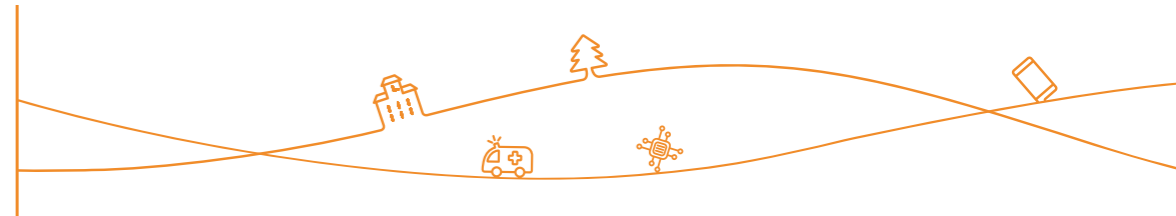
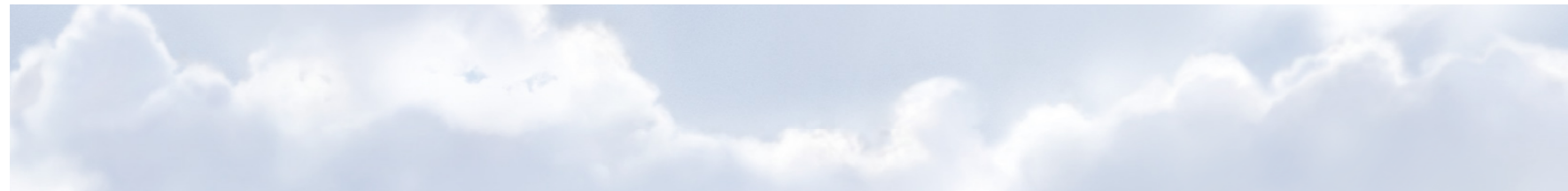
Tactile Internet applications include three typical functions: remotely controlled robotics to perform dangerous operations, simulated human tactile sense using simulation devices, and remote medical treatment and operations.

As shown in Figure 15, South Korean users are most interested in simulated human tactile sense using simulation devices, while US users have slightly higher enthusiasm for remote medical treatment and operations over the other applications. German and UK users are most excited about the potential remote medical treatment and operations which can be introduced by the technology.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 15: Interest distribution of three typical tactile Internet applications



3 MOBILE APPLICATIONS DRIVE NETWORK EVOLUTION

The constantly emerging new user requirements have been a key driving force behind mobile network evolution. Each generational evolution of the mobile network aims to solve and meet the key application requirements. During the transition from 2G to 4.5G, mobile applications experience the development from voice and short message services to high-speed and high-quality multimedia services. MBB applications emerge with increased network capacity from narrowband to broadband. The services continuously evolve from single independent service to convergent applications.

Emerging mobile applications (representative of immersive video, VR, CIoT, and tactile Internet applications) have new requirements for bandwidth, capacity, latency,

mobility, handover speed between scenarios, and the massive connection of wireless transmission networks. These innovative mobile applications require high network capabilities, which will lead to the finalization of a new generation mobile network. It is proved by history that those networks, which were planned and deployed earlier than others for higher capacity and better experience for advanced applications, are evidently more likely to attract users for emerging services. Several operators in East Asia serve as convincing examples to attract a considerable amount of new service users by deploying LTE networks. Therefore, it is of immense value and critical importance for operators to grasp opportunities and achieve a harmonious balance between competitive advantages and investment protection during network evolution.

3.1 Network Requirements of Emerging Mobile Applications

Emerging mobile applications have far higher network requirements.

As a prime example, VR applications for instance 60 frames per second (FPS) 3D program sources are one case with much higher requirements. In a mobile environment, single-user rates must reach 500 Mbps to ensure that VR and immersive video are visible to the human eye, nearly 100 times faster than that required by current 4G HD video experience. Table 1 describes network requirements

of entry-level retina displays in VR applications. Full-view 3D program sources of 120 FPS require data rates of 1 Gbps. In addition, VR requires a Round-Trip-Time (RTT) latency of less than 20 ms, but on average current 4G E2E RTT latency is higher than 40 ms. Therefore wireless VR applications have strict bandwidth and latency requirements that cannot be fully fulfilled by current networks. This requires either the massive improvement of the current networks or the planning and deployment of new networks to support these high-end wireless services.

VR Program Source	Resolution	Bandwidth Requirement		
		30FPS	60FPS	120FPS
Full-view 2D	5760x5760	128Mbps	256Mbps	512Mbps
Full-view 3D	5760x5760x2	256Mbps	512Mbps	1Gbps

Table 1: Network bandwidth requirements of VR entry-level retina (Data source: Wireless X Labs)

In the future consumers have proposed unprecedented requirements for 100% network coverage, low power consumption, low costs, and high reliability of the most anticipated CIoT. This requires operators to rapidly deploy a network featuring full coverage, ultra-high dense connections, and low power consumption to resolve issues

of massive connections and real-time communications.

The next-generation network must be proactively deployed to efficiently provide innovative mobile services representative of immersive video, VR, CIoT, and tactile Internet applications.

3.2 Mobile Application Development Drives Network Evolution

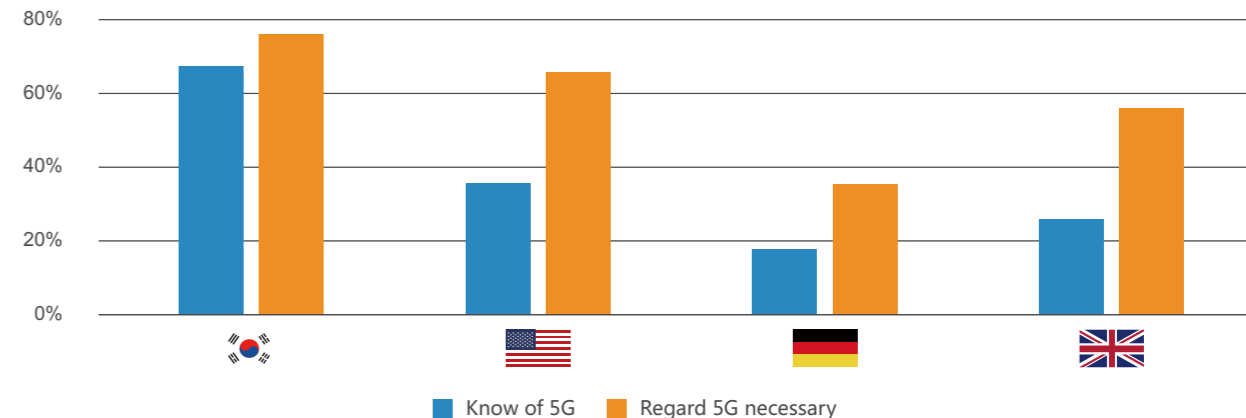
Mobile Internet and CIoT are key driving forces behind 5G development. Remarkable traffic growth and superior 5G experience are the biggest challenges facing 5G over the next ten years. 5G networks must identify how to satisfy experience requirements for transmission rates, latency, and mobility to resolve issues caused by massive connections, high traffic density, and other additional key indicators.

user experience boasting ultra-high capacity, ultra-low latency, faster speed, and massive connections to accommodate a diverse range of low-cost applications in comparison to 4G.

3.2.1 5G Wins an Average Market Perception of 36%

Figure 16 shows that 5G wins an average market perception of 36% in the four countries, with 58% of consumers adamant that 5G applications are a basic necessity.

5G development is based on 4G and provides an excellent



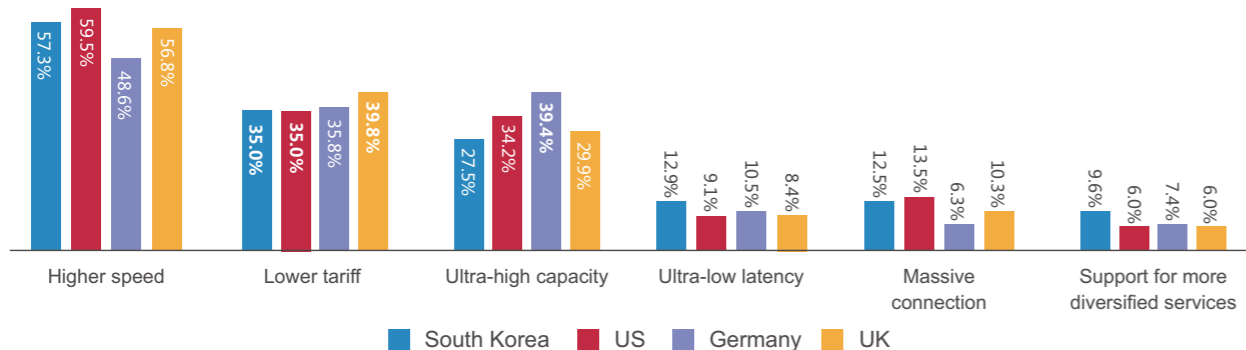
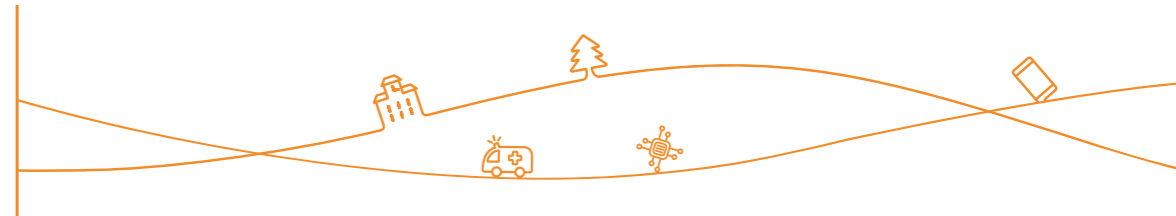
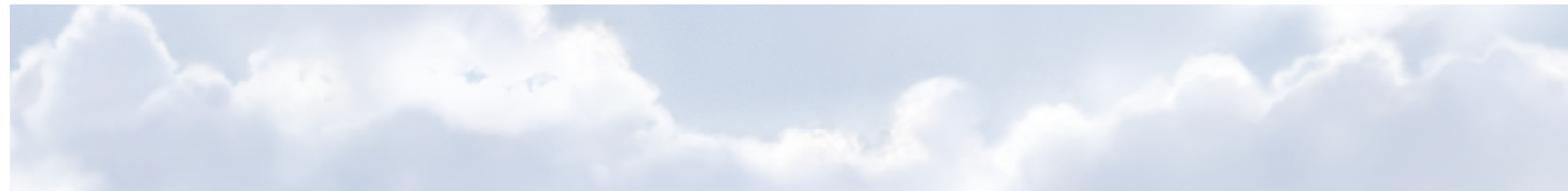
Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 16: Market recognition of 5G networks in the four countries



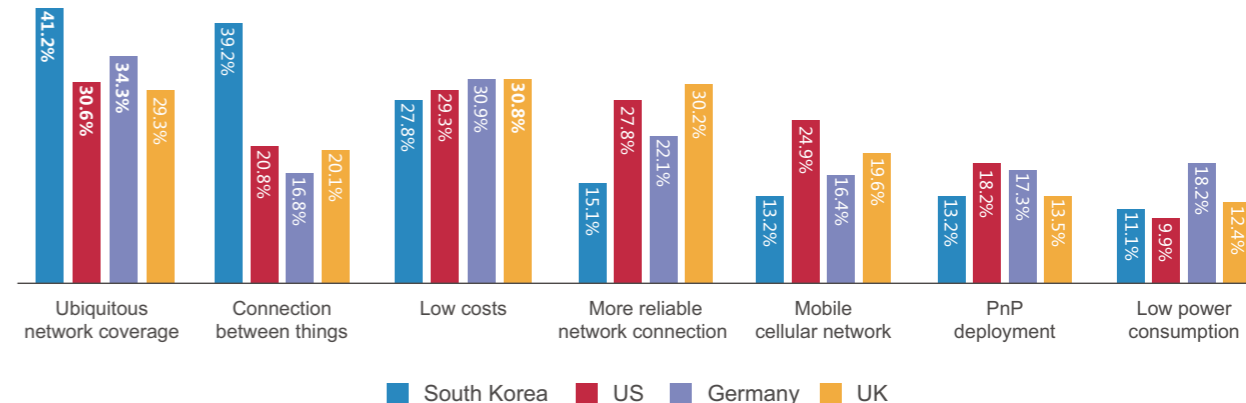
3.2.2 "Higher speed" Wins the Highest 5G Market Potential

Market potential index in Figure 17 is calculated based on concept acceptance and attraction levels in terms of concept propagation, readability, comprehensibility, and attraction. "Higher speed" is the most important highlight in the four countries and pertains to the highest market potential index in the US. "Lower tariff" is also high in the US, UK, and South Korea, while "ultra-high capacity" is high in Germany.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 17: Market potential index of multiple 5G benefits

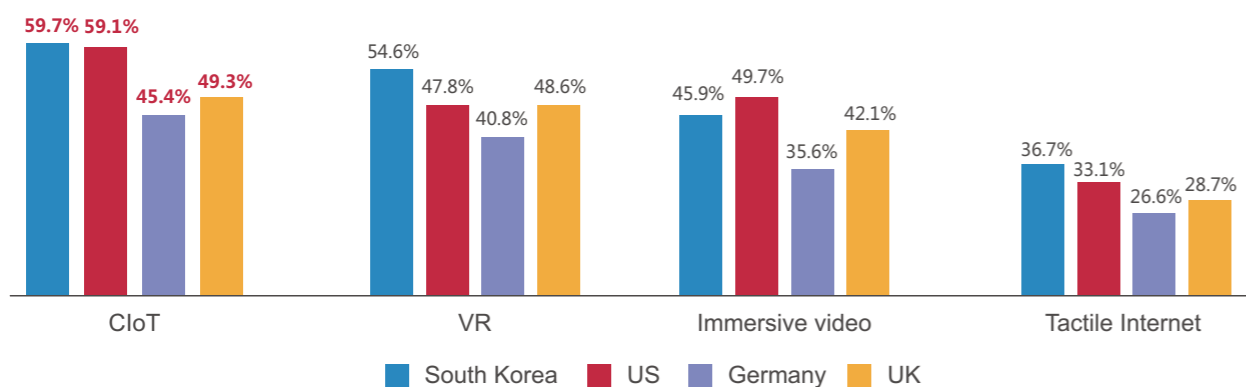


Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 19: Market potential index of different IoT applications

3.2.3 IoT Is the Most Expected 5G Application

Figure 18 shows that IoT is the most expected 5G application with tactile Internet shown as the least. Besides IoT applications, South Korean and German consumers most expect the arrival of VR, and the US consumers have the highest anticipation for immersive video. MBB Internet and IoT equally constitute to the main driving forces behind the continual development of 5G technology.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 18: Value recognition of different 5G applications

3.2.4 IoT's "Ubiquitous Network Coverage" and "Low Costs" Win the Highest Market Potential

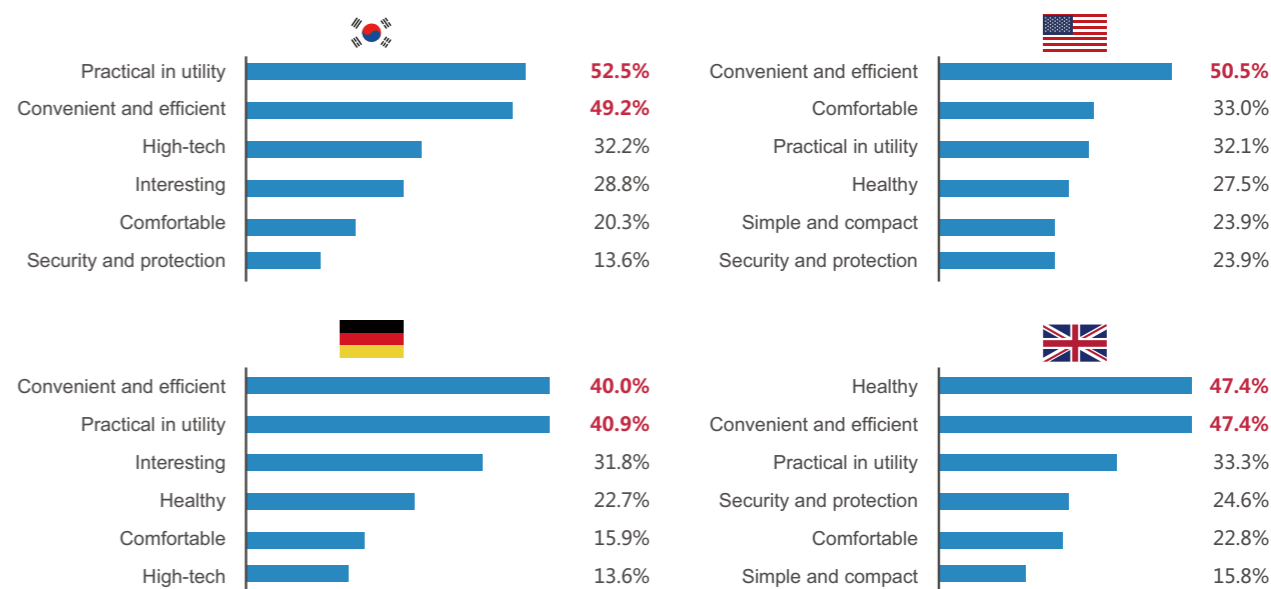
Figure 19 shows that "ubiquitous network coverage" wins the highest market potential in South Korea, US, and

Germany. "Low costs" is the highest in the UK, followed by "more reliable network connection" and "ubiquitous network coverage". "Ubiquitous network coverage" is the highest in the South Korea, followed by "connection between things".

3.2.5 "Convenience and Efficiency" and "Practical Utility" Are key IoT Benefits

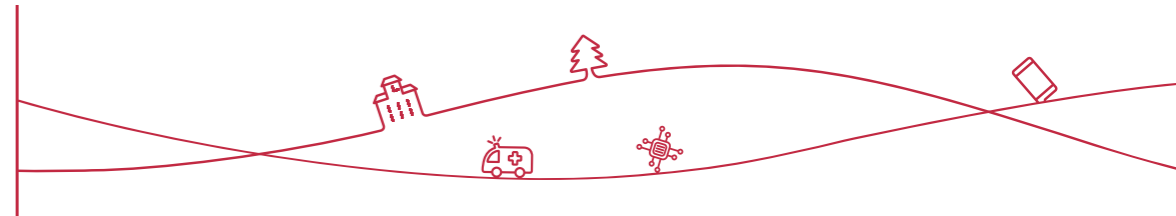
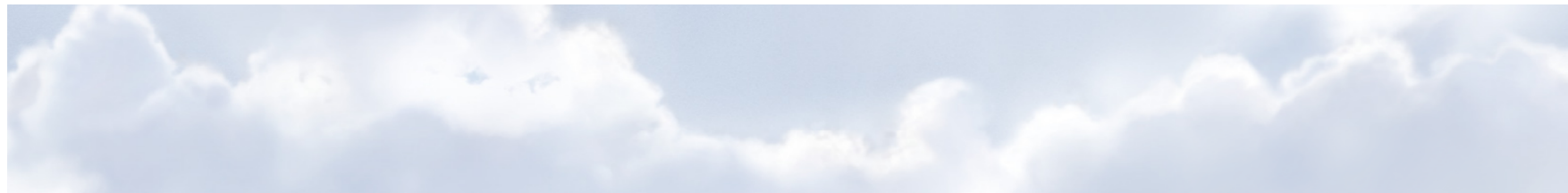
As shown in Figure 20, "convenient and efficient" and "practical in utility" are the most important reasons for consumers to use IoT applications, and are least affected by external factors (to follow a trend or accept a friend's recommendation). The four countries have divergent

preferences, with South Korean users claiming that "high-tech" and "interesting" characteristics are of relatively high importance. US users regard "comfortable" and "healthy" as highly significant, while German users prefer "interesting" and "healthy", and UK users select "healthy" and "convenient and efficient" as major top priorities.



Data source: South Korean, US, German, and UK consumer survey by Huawei Wireless X Labs (3200 samples)

Figure 20: Driving forces behind the usage of IoT applications



4 POSTSCRIPT

4.1 Disclaimer

The provided information is used for reference only. This report cannot be used as a basis for investment or research decision-making, or as a basis or proof of ethic, responsibility, or law purpose, either expressed or implied. Huawei Wireless X Labs may supplement, revise, and correct information in this report without prior notice. Every effort is attributed to the preparation of this report to ensure the provision of accurate information. Huawei Wireless X Labs does not bear any liability for any direct or indirect investment profit and loss due to information held within this report.

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4.2 Objective and Methodology

The mobile Internet consumer survey report was completed by mLab in affiliation with Huawei Wireless X Labs and Peking University's Center for Market and Media through online questionnaires conducted during the first half of 2016.

The survey conclusion aims to explore consumers' requirements, attitudes, and expectations for 5G-compliant mobile communication services (immersive video, VR, CIoT, and tactile Internet). The final conclusion can then be used to present supportive data for 5G network deployment and service scenarios from a unique consumer perspective, and provide a convincing reference for future network evolution.

This report provides an analysis and summary

based on a consumer survey performed on four representative countries (South Korea, USA, Germany, and UK). 800 samples are selected for each country (3200 samples in total) to represent conditions of each market. Gender and age quota complies with that released by the National Bureau of Statistics. The quantity of senior users is reduced to enable sample data to be a true representative depiction of market conditions according to actual weighted sample structures, considering that emerging applications are more favorable among young people. Samples are selected in each city based on Access Panel and the survey is performed through online questionnaires. All surveyed data is quantitatively analyzed for statistics to derive conclusive assessment criteria.

4.3 About Huawei Wireless X Labs

Huawei Wireless X Labs aims to explore, nurture, and develop new applications that are likely to provide considerable contributions to wireless communications development and help build an open and healthy ecosystem through industry research and cooperation. Wireless X Labs includes mLab, vLab, hLab and XIC:

mLab engages in research on consumer application scenarios based on business to consumer (B2C) applications.

vLab conducts research into vertical industry application scenarios based on business to vertical (B2V) applications.

hLab performs research on home application scenarios based on business to home (B2H) applications.

XIC are Innovation Centers (IC) which cooperate with industrial leaders in key areas on joint innovation and build industrial ecosystem.

4.4 About Authors

This consumer survey report is jointly prepared by mLab (in affiliation with Wireless X Labs) and MBB MOs.

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