

Team 104

Jinglin Wu

Xinjie Shan Ruihan Yuan

Yuzheng Li Shizhen Jin

## **▶** Tencent Games

## Our Mission Is!!









"Value for ALL Users,
Tech for Good"



170 billion RMB





conclusion



graphs~

170 billion RMB

population (million) 1412 17.3 (blind) (approx. 1.23% of total population) Source: National Bureau of Statistics of China

Less than 0.1%

number of games (m) 0.56 (normal) 0.00004 (blind) Source: NPPA (National Press and Publication Administration

problem indentification introduction

solution/approaches

financial projections

conclusion

## The Current situation of Tencent Games



## Highly saturated mainstream market

Tencent Games / Mainstream market

User saturation / Growth bottleneck



## The blind community: A neglected market



Visually impaired group / neglect

The demand exists / Potential market / Lack of accessibility

## Drive game accessibility for visually impaired player inclusion



Accessibility Improvement / User Growth

Profit Breakthrough / Long-term Benefits



## **Current Status of Accessibility in Tencent Games**





# Interview





various kinds of game

Big games



Low quality

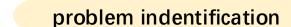
- "2 years old" games
- Inferior sound quality



- only two in China
- "something else instead of Blind sticks"

## **Equity**

- "I want to be treated **equally**"
- Play with the normals









244 questionnaires collected

- Q. Are you interested in gaming and have a need to play games
- A. 83.2% people say"I'm interested in games."
- Q. Would you like to play a game with a non-visually impaired person?
- A. More than 70% people say"I do"
- Q. What games would you like to be able to play
- A. 74.5% people say"Honer of Kings"



# Honor of Kings

## 1/7 Chinese people plays it





Genre: MOBA (Multiplayer Online Battle Arena), 5v5 team-based combat.



Destroy the enemy's base ("Crystal") while defending your own













introduction

# What is Our Strategy?

# **Advance Accessibility Adaptations to Honor of Kings** for the Visually Impaired !!!





# **Demand Study & Feasibility Analysis**

solution/approaches







 Strong technical skills and experience in accessible game development

· Honor of Kings has a large user base, great influence, and is supported by many parties



Making it accessible can be difficult and requires a significant investment of time and effort.



May face a lack of understanding from some regular players who think the accessibility features will affect the fairness of the game



- The policy supports enterprises to carry out barrier-free product modification
- This can enhance the corporate image, expand the market of players with disabilities and increase the user group.

financial projections

# **Steps Toward Accessibility**



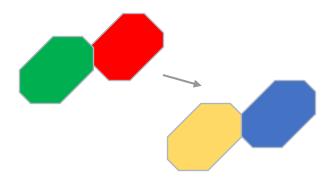






### UI Transformation

- · Disable the red and green
- · Change to blue and yellow contrast



- · Enlarge button to 9mm x 9mm
- · Utilize voice announcements to revamp the hero selection interface

## Audio Engine

- · Indicates location by sound frequency and volume
- · Filter noise to focus on critical information



- · Hero voice (emergency)
- · Skill release sound effect (critical)
- · Defense tower attack (strategy)
- · Wild monster refresh (resource)

## Interaction Logic Refactoring

- · Deliver tactical information with vibration
- · Layer design instructions (from basic to advanced)





- · Light vibration: Normal event
- · Medium vibration: Critical event
- · Heavy vibration: Emergency event

introduction



## **Test Functional Validity**





# Closed-loop internal testing + AI-assisted optimization



Invite 20 visually impaired players from different backgrounds



- Provide specialized training
- · Help them familiarize themselves with the operation of the accessibility version



- · Record player operating behavior and collect data
- · Utilize questionnaires and interviews to understand subjective feelings about the game experience

### **Public Beta + Bug Fixes**

Open to visually impaired players nationwid



Establish multiple feedback channels



Optimize the game continuously



Quickly locate and resolve specific bugs

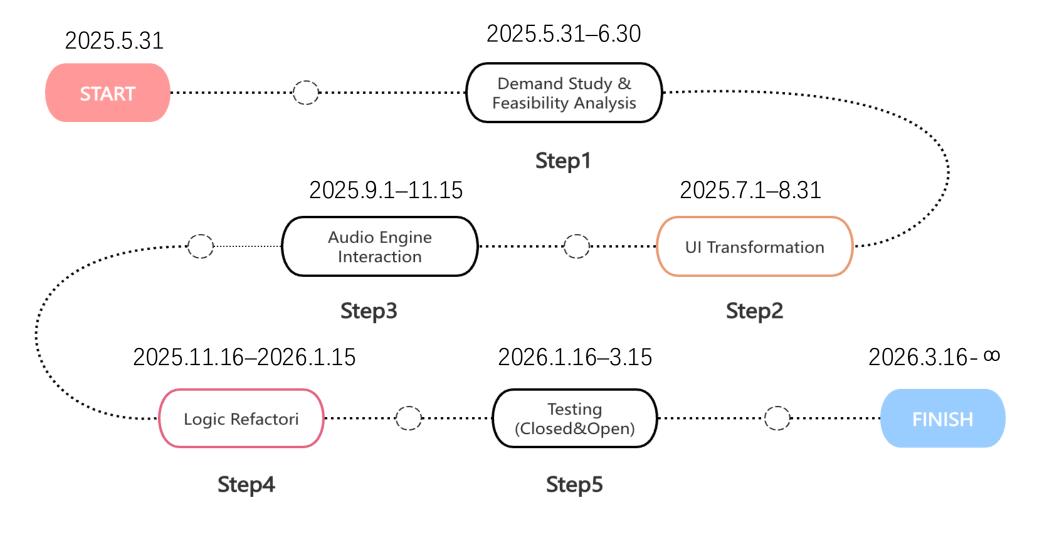




# Specific timeline









## Stakeholders in the business Plan



Participants	Responsibility	Benefits
Governments	Policy & Regulation Support Coordination & Advocacy	Achieve <b>Social Equity &amp; Inclusion Goals</b> Improve <b>Public Image</b>
<b>Blind Associations</b>	Assist in <b>user recruitment</b>	Use accessible gaming <b>education programs</b> Broader <b>advocacy reach</b>
The Visual Impairment	<b>Playing</b> the games	Access to a <b>previously inaccessible</b> game Opportunities for <b>social interaction</b>

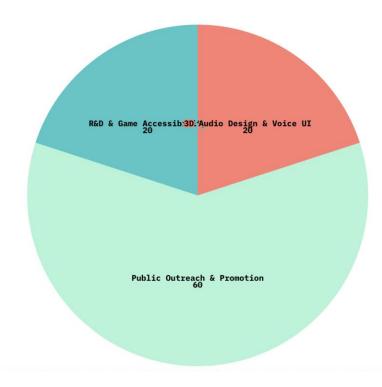
**Partnerships:** China Blind Association – user research and outreach Media platforms (e.g. WeChat, Douyin) – for campaign visibility Tencent Charity Foundation – funding and PR

# **Budget Plan**





Category	Cost (RMB)	Details
R&D & Game Accessibility	¥3,000,000	UI redesign, haptic feedback, blind-friendly interfaces, QA testing
3D Audio Design & Voice UI	¥1,000,000	Spatial sound, audio cues, screen reader support, voice-over guidance
Public Outreach & Promotion	¥1,000,000	Inclusive campaign, NGO engagement, user education
Total	¥5,000,000 (~USD \$695,000)	Completed within 12 months



Benchmark references from Tencent CSR reports, audio tech industry norms, and blind-accessible game R&D costs.

# **Fundings and Revenue**

Source	Amount (RMB)	Explanation
Tencent CSR & Foundation	¥2,000,000	Internal allocation from Tencent's multi-billion charity foundation
Government Grants	¥1,500,000	Apply under national "14th Five-Year Plan" & accessibility tech innovation funding
Public Fundraising (99 Giving Day)	¥750,000	Leverage Tencent donation platforms; 2020 campaign raised ¥3.04 billion
Corporate Sponsors (e.g. Xiaomi)	g., ¥750,000	Tech partners with accessibility goals; co-funding or in-kind support for devices/PR
Total introduction	¥5,000,000 oroblem identification	All sources secured via strategic partnerships and public engagement solution/approach es

### **Estimated Revenue:**

The number of visually impaired people in China:

~17 million people



Estimated rate of new users: **1%** 



HOK average consumption:

500¥



¥8,500,000

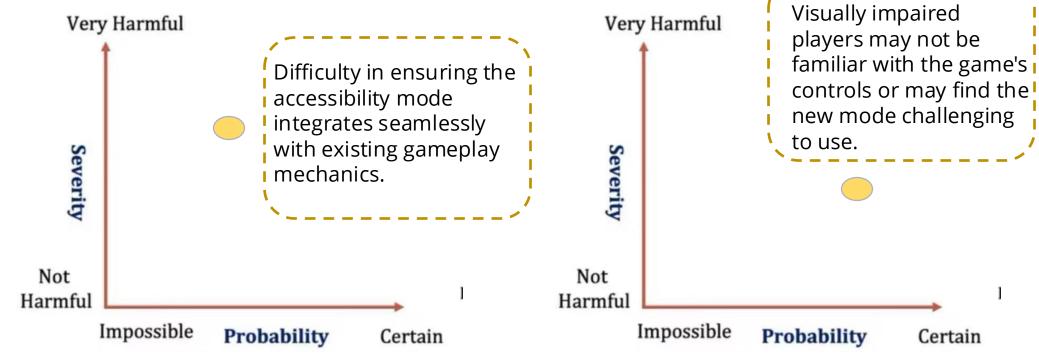
Enhancing its **reputation** as responsible and innovative industry leader.
The project significantly improves
Tencent's **ESG performance** in the "Soci dimension

Funding plan supported by Tencent's ESG strategy, China's disability tech policy, and public-private partnerships.

financial projections

conclusion

# **Risk Analysis**



## **Technical Challenges in Integration**

- Conduct extensive prototyping and early-stage user testing.
- Form a dedicated task force within TiMi Studios and Next Studio to focus on cross-functional testing.
- Use iterative design cycles

## **User Adoption Resistance**

- Organize focus groups and beta tests during the early stages.
- Provide comprehensive tutorials and support for new users
- Incorporate feedback loops

mitigations

introduction

problem identification

solution/approach es financial projections

conclusion

# **Future Market Prospects**

- Q. If **Honor of Kings** released an accessible version (with voice navigation, audio feedback, etc.), how interested would you be in trying it out?
- A. **31.22%** of people said they were **very** interested, and **24.43%** said they were somewhat interested.
- Q. If we invited you to participate in testing the accessible version of Honor of Kings and provide feedback, would you be willing to join?
- A. More than 88% people say"I do"
- Q. How **significant** do you think an accessible version of Honor of Kings would be for people with visual impairments?
- A. Approximately 85% of people said it would be highly significant and could improve quality of life.

## **Conclusion:**

"People who came to interview us never actually follow through with real action"——Mrs.Cui

Social impact:



1.Addresses exclusion of 17M visually impaired in China

2. Promoting equity

Significance for Visually Impaired Individuals:

- 1. Enables equal gaming, social interaction, entertainment
- 2.Brings visually impaired players into gaming culture for greater social connection



- 1.Engages players, NGOs, government, aligns with Tencent's "Tech for Good."
- 2.Boosts long-term ESG profile and social value.

# Collaboration report: Wyatt - Technical Development & Accessibility Features

Wyatt led the technical implementation of core accessibility functions. From prototyping voice control features to testing screen reader compatibility, he turned design ideas into working software elements. His leadership in this area ensured that the technology was not only innovative but also practical and inclusive.

### Aurora – User Experience & Design

Aurora played a crucial role in keeping our project user-centered. She consistently focused on the real needs of visually impaired users and guided the team to make decisions grounded in empathy and practicality. Her insights helped shape key features such as voice navigation and audio feedback, and she worked closely with the development team to ensure usability.

#### Allen – Research & Risk Assessment

Allen was responsible for gathering solid data and supporting our proposal with well-rounded research. He analyzed existing accessibility models, conducted user surveys, and evaluated potential risks involved in development and launch. His detailed analysis helped guide our roadmap and gave our proposal credibility and depth.

introduction

problem identification

solution/approaches

financial projections

conclusion



# **Collaboration report:**

### William – Finance & Partnerships

William oversaw the financial and partnership aspects of the project. He developed a sustainable funding model and identified potential collaborations with NGOs and accessibility-focused organizations. His work ensured that the project had both sufficient resources and a safety net to support future growth and implementation.



### **Linda – Project Structure & Strategic Justification**

Linda focused on building the structure and background of the proposal. She clearly articulated the societal value of the project and constructed the argument for why Tencent should lead the initiative. Her writing and strategic framing positioned the project as both impactful and feasible, aligning it with corporate social responsibility goals.

introduction

problem identification

solution/approaches

financial projections

conclusion

## **Teamwork & Thanks**











**Aurora** 

Allen

William

Linda

Wyatt



## Interview Notes: Blind Gamers' Accessibility Requests

## Interview Notes

Date: 2025/05/31

Participants: [2 blind gamers, including 1 developers]

#### 1. Core Requirements

Platform: PC (preferred) > Mobile.

Why: Keyboard navigation is more precise than touchscreens.

No Complex Narratives: Avoid text-heavy plots; prioritize mechanics.

#### 2. Critical Features

#### A. Sound Design

3D Audio: Directional cues for enemies/objects (e.g., The Last of Us Part II).

Voice Narration: Auto-read menus/buttons (like Screen Readers).

**Keyboard Controls** 

Full Keyboard Mapping: No forced mouse inputs.

Simple Combos: E.g., Single-key skills instead of multi-key.

API/Plugin Support

Duping Software (e.g., OCR/Text-to-Speech):

Allow third-party APIs to fetch in-game text (e.g., chat, menus).

Support plugins for image recognition (e.g., "Enemy 3 o'clock").

Open Accessibility Standards: Follow Microsoft's Game Accessibility Guidelines. Simplified

Modes

Audio-Only Mode: Replace visuals with sound (e.g., A Blind Legend).

Auto-Targeting: Reduce need for precise aiming.

#### 3. Pain Points

Current Games: 99% are unplayable without sighted help.

APIs Blocked: Many games ban screen readers/OCR for "anti-cheat."

#### 4. Developer Asks

Test with Blind Gamers Early. Document Accessibility Features clearly. Quote from Participant:

"We don't need pity – just games that respect our time. A 'ping' sound tells me more than 4K graphics."

### **Questionnaires:**

#### 无障碍《王者荣耀》问卷调查

1. 您是否听说过"Accessible Glory"项目(将《王者荣耀》改造成视障人士可玩的无障碍游戏)? [单选题]

选项	小计	比例
A. 听说过,且了解详情	1	33.33%
B. 听说过,但不了解详情	1	33.33%
C. 第一次听说	1	33.33%
本題有效填写人次	3	

2. 如果《王者荣耀》推出无障碍版本(支持语音导航、音频反馈等),您有多大兴趣尝试?[单选题]

选项	小计	比例
A. 非常感兴趣	69	31.22%
B. 有些感兴趣	54	24.43%
C. 不太感兴趣	53	23.98%
D. 不感兴趣 (请说明原因)	43	19.46%
(空)	2	0.9%
本題有效填写人次	221	

3. 我们的无障碍《王者荣耀》提供以下功能,您认为哪些对您最重要?(多选) [多选题]

选项	小计	比例
A. 语音导航(例如,提示角色选择、地图位置)	96	43.44%
B. 音频反馈(例如,技能释放、战斗状态的音效提示)	80	36.2%
C. 屏幕阅读器兼容(与您的辅助设备无缝衔接)	36	16.29%
D. 简化操作(如减少复杂按键)	20	9.05%
E. 其他(请说明)	0	0%
本題有效填写人次	221	

4. 您对无障碍《王者荣耀》的游戏体验最期待的是什么?(单选或排序) [单选题]

选项	小计	比例
A. 与健全玩家公平竞技的机会	92	41.63%
B. 流畅且易用的操作体验	69	31.22%
C. 清晰的语音和音频提示	41	18.55%
D. 社交互动(如与朋友组队)	19	8.6%
本題有效填写人次	221	

5. 您是否希望与健全玩家一起玩无障碍《王者荣耀》? [单选题]

选项	小计	比例
A. 非常希望	76	34.39%
B. 可以接受	86	38.91%
C. 更希望只与视障玩家玩	43	19.46%
D. 无所谓	16	7.24%
本題有效填写人次	221	

6. 您通常使用哪些辅助设备或软件(如屏幕阅读器、语音助手)来操作手机或电脑?这些设备对无障碍《王者荣耀》的兼容性有多重要?[多选题]

选项	小计	比例	
A. 非常重要	183		82.81%
B. 比较重要	23	_	10.41%
C. 不太重要	17	•	7.69%
D. 不重要(请说明原因)	0		0%
本題有效填写人次	221		

7. 如果我们邀请您参与无障碍《王者荣耀》的测试并提供反馈,您是否愿意加入?[单选题]

选项	小计	比例
A. 愿意(请提供联系方式,如微信或部箱)	195	88.24%
B. 不确定(清说明原因)	15	6.79%
C. 不愿意 (请说明原因)	11	4.98%
本題有效填写人次	221	

8. 您认为无障碍《王者荣耀》对视障人士的意义有多大?[单选题]

选项	小计	比例
A. 意义重大,能提升生活质量	187	84.62%
B. 有一定帮助,但需改进	29	13.12%
C. 意义有限(请说明原因)	5	2.26%
本題有效填写人次	221	

### **Financial statement**

Table 1: Estimated Project Expenses for Accessibility Upgrade

Category	Estimated Cost (RMB)
R&D (UI redesign & accessibility)	3,000,000
3D audio & voice guidance	1,000,000
Public awareness & promotion	1,000,000
Total	5,000,000

Table 2: Proposed Funding Sources

Source	Proposed Amount (RMB)
Tencent CSR/Foundation	2,000,000
Government Grants	1,500,000
Public Donations (Tencent)	750,000
Corporate Sponsorship	750,000
Total	5,000,000

All budget estimates and funding sources are based on industry benchmarks, previous CSR project data, government policy reports, and philanthropic funding trends, with detailed references provided in the Reference section.

Table 3: Justifications for Budget and Funding Sources

Item	Justification
R&D Costs	Covers 6+ months of design and engineering for screen
	reader support, UI adaptation, testing. Industry reports
	cite > RMB 1M for accessible features in mobile games.
Audio Design	Spatial audio and voiceover require audio engineers, tools,
	middleware, and VO actors. Estimated from industry
	norms of immersive sound costs.
Public Promotion	For disability awareness campaigns, NGO events, school
	outreach. Reference: Tencent's 99 Giving Day campaigns
	exceeded RMB 3B in donations.
Tencent CSR	Tencent has donated RMB 4.3B+ to its foundation. Their
	CSR projects frequently exceed RMB 10M.
Gov Grants	China's 14th Five-Year Plan supports disability tech; MIIT
	and local funds provide R&D support. Estimated RMB
	1.5M for mid-scale assistive project.
Public Donations	Based on Tencent performance (e.g., 2020: RMB 3.044B),
	even a niche project may raise RMB 0.5M-1M.
Corporate Sponsors	Xiaomi and similar firms have accessibility CSR. Estimated
	750K RMB from co-branding, hardware donations, or fund-
	ing.

#### 视障玩家游戏无障碍需求评估量表

## **Questionnaires:**

1. 您是否对游戏有兴趣,并有玩游戏的需求? [单选题]

选项	小计	比例
感兴趣	203	83.2%
不感兴趣	41	16.8%
本题有效填写人次	244	

#### 2. 您喜欢的游戏类型是? [单选题]

选项	小计	比例
音乐游戏(如节奏大师)	64	26.23%
文字/剧情冒险类	21	8.61%
解谜类	29	11.89%
休闲类(如2048、消消乐)	46	18.85%
竞技类游戏(如王者荣耀)	58	23.77%
策略/卡牌/桌游	26	10.66%
本题有效填写人次	244	

#### 3. 您愿意和非视障者一起进行游戏吗? [单选题]

选项	小计	比例
愿意	171	70.08%
不愿意	26	10.66%
无所谓	47	19.26%
本題有效填写人次	244	

#### 4. 如果您对游戏有着浓厚的兴趣,但目前没有玩或玩得不顺利,主要原因是什么?[单选题]

选项	小计	比例
游戏缺少语音引导,无法获得必要信息	71	29.1%
读屏软件无法识别游戏界面和内容	60	24.59%
声音提示不清晰或没有方向感,难以定位敌人或队友	39	15.98%
操作方式复杂,不便盲人单独操作(如频繁滑动、多按钮)	37	15.16%
游戏机制复杂,逻辑难以理解或跟上节奏	37	15.16%
其他:	0	0%
本题有效填写人次	244	

#### 5. 您玩过或听说过以下哪些游戏? [多选题]

选项	小计	比例
王者荣耀(腾讯)	182	74.59%
和平精英(腾讯)	89	36.48%
英雄联盟手游(腾讯)	94	38.52%
金铲铲之战(腾讯)	69	28.28%
天涯明月刀手游(腾讯)	58	23.77%
本題有效填写人次	244	

## **Audio & Haptic Feedback Technical Specifications:**

## **Enemy Hero Positioning Audio Encoding**

Position	Left Ear Audio	Right Ear Audio	Haptic Feedback
Left Melee (≤300 units)	80Hz Low-frequency Drum (120BPM)	None	Left Motor Long Vibration (300ms, 70% intensity)
Right Ranged (>300 units)	None	3kHz High-frequency Bell (50ms interval)	Right Motor Short Vibration (150ms, 50% intensity)
Rear Ambush (≤200 units)	120Hz Low-frequency Pulse (20ms interval)	120Hz Low-frequency Pulse (sync)	Dual Motor Strong Vibration (500ms, 100% intensity)

### Key Skill Sound Encoding

Skill Name	Audio Characteristics	Haptic Feedback Configuration	Tactical Indication Logic
Daji's Ultimate	4kHz Continuous High-frequency Wave (3- second decay)	Dual Motor High-frequency Vibration (200ms interval)	Warns of area-of-effect damage
Lü Bu's Leap Strike	120Hz Low-frequency Thud (50ms pre- vibration)	Dual Motor Sync Strong Vibration (400ms)	Alerts of charging attack
Sun Bin's Ultimate	800Hz Circular Sound (outward diffusion)	Dual Motor Alternating Vibration (Left→Right→Left)	Indicates time distortion zone
Hou Yi's Ultimate	2kHz Parabolic Sound (pitch decreases with distance)	Left Motor Single Long Vibration (300ms)	Shows direction of long-range shot

## **Audio & Haptic Feedback Technical Specifications:**

## Haptic Feedback Motor Encoding

Game Event	Left Motor Parameters	Right Motor Parameters	Trigger Logic
Skill Cooldown Ready	100ms Short Vibration (10Hz, 40% intensity)	None	Starts 5 seconds before cooldown ends
Turret Under Attack	None	300ms Long Vibration (5Hz, 60% intensity)	Triggers per turret HP stage (every 20% drop)
Teamfight Warning	Continuous Pulse (50ms interval, 80% intensity)	Continuous Pulse (sync)	Activates when 5v5 hero clustering detected
Monster Spawn	3 Short Vibrations (50ms each)	3 Short Vibrations (sync)	When Blue/Red Buff, Lord, or Tyrant spawns
Kill/Assist	Alternating Dual Motor Vibration (Left→Right→Left)	Alternating Dual Motor Vibration (sync)	Triggers 1.5 seconds after event

## Audio Priority Hierarchy

Priority	Event Type	Audio Processing Rule	Example
Critical (P1)	Hero Voice/Skill Hit	Interrupts other sounds, +20% volume boost	"Beware of the grass!" / Daji's Ultimate hit
Key (P2)	Enemy Approach/Turret Attack	Mixed play without interruption, baseline volume	Left melee enemy audio + turret vibration
Strategic (P3)	Monster Spawn/Economy Report	Background play, -30% volume	Blue Buff spawn sound
Secondary (P4)	Minion Death/Item Purchase	Plays only when no P1-P3 events, 50% volume	Cannon minion death notification

## Reference

Gov.cn (2021, July 21). Five-year plan unveiled for supporting disabled. The State Council of the People's Republic of China. https://english.www.gov.cn/policies/latestreleases/202107/21/content\_WS60f81715c6d0df57f98dd589.html

Gov.cn (2020, December 6). Technologies improve information accessibility for China's disabled. The State Council of the People's Republic of China.

https://english.www.gov.cn/news/topnews/202012/06/content\_WS5fcc1443c6d0f72576941653.html

Microsoft Stories Asia. (2022, May 11). Microsoft China, Xiaomi Group and Shanghai Youren Foundation Release Inclusive Design Manual in China to Create an Accessible Future.

https://news.microsoft.com/apac/2022/05/11/microsoft-china-xiaomi-group-and-shanghai-youren-foundation-release-inclusive-design-manual-in-china-to-create-an-accessible-future/

Sixth Tone. (2021, November 5). The Visually Impaired Developers Making Games in the Dark. https://www.sixthtone.com/news/1004383

Tencent. (n.d.). 99 Giving Day. Retrieved June 1, 2025, from https://www.tencent.com/en-us/esg/99-giving-day.html

Tencent. (n.d.). Responsibility - Tencent Charity Foundation. Retrieved June 1, 2025, from https://www.tencent.com/en-us/responsibility/tencent-charity-foundation.html

u/AnonymousRedditor. (n.d.). How much does it cost to make a game? [Online forum post]. Reddit. Retrieved June 1, 2025, from https://www.reddit.com/r/gamedev/comments/qpyqyk/how\_much\_does\_it\_cost\_to\_make\_a\_game/