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EXECUTIVES

Reg Chai

Investor Relations Director

Xueji (Jerry) Wang

Founder, CEO & Director

Yi (Alex) Yang

Co-Founder, CFO & Director

ANALYSTS

Timothy Zhao

Goldman Sachs, Analyst

John Roy

WaterTower Research, Analyst

Kai Xiao

CICC, Analyst

Yang Liu

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Presentation

Operator

Good morning, and good evening, ladies and gentlemen. Thank you for standing by, and welcome to Tuya Inc.'s fourth quarter 2024 earnings conference call. (Operator Instructions)

I will now turn the call over to the first speaker today, Mr. Reg Chai, Investor Relations Director of Tuya. Please go ahead, Reg.

Reg Chai

Investor Relations Director

Thank you. Hello, everyone. Welcome to our fourth quarter 2024 earnings call. Joining us today are Founder and CEO of Tuya, Mr. Jerry Wang; our Co-founder and CFO, Mr. Alex Yang.

The fourth quarter 2024 financial results and webcast of this conference call are available at ir.tuya.com. A replay of this call will also be available on our IR website in a few hours. Before we continue, I refer you to our Safe Harbor statement in our earnings press release, which applies to this call, as we will make forward-looking statements.

With that, I will now turn the call to our Founder and CEO, Mr. Jerry Wang. Jerry will deliver his remarks in Chinese, which will be followed by a corresponding English translation. Jerry, please.

Xueji Wang

Founder, CEO & Director

Hello, everyone. Thank you for joining Tuya's fourth quarter 2024 and full-year 2024 earnings call. In 2024, we achieved nearly 30% year-over-year revenue growth and reached two significant financial milestones: first, our inaugural quarterly and annual non-GAAP operating profitability; and second, our first-ever annual GAAP net profit. The former validates Tuya's unique business model, while the latter provides us with greater flexibility at the statutory shareholders' equity level, enabling us to take further strategic actions. These achievements strengthen our confidence in the company's future growth.

2024 was a year of unwavering commitment to AI research and development. In the second quarter of 2024, we launched Tuya's proprietary AI large model, Spatial LLM, while continuing to advance On-Device AI. Our goal is to leverage Gen AI to significantly enhance smart product experience, providing our customers with superior product competitiveness and end-users with more valuable smart features and functionalities. We firmly believe that AI, IoT, and cloud technologies will drive a new era of user experience and substantially increase the penetration of smart devices.

Over the past year, we have also made significant strides in upgrading Tuya's unique software-and-hardware integrated business model, extending beyond PaaS into a hardware solution model. Whether in our core strength—smart home—or in commercial verticals such as hospitality, real estate, mobility, and renewable energy, we are dedicated to providing developers with increasingly competitive hardware solutions. This allows our customers to expand their competitiveness beyond Powered-by-Tuya software capabilities into supply chain and hardware advantages. As a result, we have gained further customer recognition, driving an approximately 58% year-over-year growth in our Smart Solution revenue stream.

Looking ahead to 2025, we will be fully committed to building a global AIoT developer ecosystem. This includes ongoing iterations of our AI Agent and TuyaOS developer products, as well as AIoT open-source software solutions such as TuyaOpen, to build long-

term competitive advantages. Meanwhile, we remain committed to capitalizing on growth opportunities in international markets, accelerating the development of AIoT and AI applications worldwide, and delivering long-term value to our shareholders.

To allow more time for discussions and Q&A, our Co-Founder and CFO, Alex, will now provide more details on our business and financial performance.

Yi (Alex) Yang

Co-Founder, CFO & Director

Hello, everyone. I'm Alex. Today, we would like to share an overview of our 2024 performance and our thoughts for the future. Before that, let me summarize our recent financial results.

We wrapped up Q4 2024 on a strong note, delivering about \$82 million in revenue, representing a solid 27.4% year-over-year growth. Given the higher base from the prior year, this growth demonstrates strong momentum. Our Q4 PaaS revenue reached about \$59.3 million, up 25.7% year-over-year, driven by our strong foundational market position and value proposition, enabling rapid transmission of customer expansion and end-market demand into revenue. SaaS & Other revenue was about \$11.5 million, up 21.1% year-over-year, benefiting from the stable growth of SaaS value-added services across our extensive devices base. Smart Solution revenue reached about \$11.3 million, growing by 45.5% year-over-year, supported by robust demand across categories such as gateways, central controls, and energy efficiency solutions.

For the entire year, our total revenue reached about \$298.6 million, making nearly 30% year-over-year growth. Our overall gross margin remained stable at around 47%, while annual operating expenses declined by approximately 10% year-over-year due to continued cost discipline of the company. As a result, revenue and gross profit growth efficiently translated into operating profits—leading to a 7.4% non-GAAP operating margin and a 25.2% non-GAAP net profit margin, with GAAP profitability achieved for the first time as well. On the cash flow side, we generated around \$80.4 million in positive operating cash flow for 2024. Following the dividend declared in August and paid in October, we ended Q4 with a net cash balance of over \$1 billion, maintaining a strong liquidity position.

Throughout 2024, we observed sustained growth in end-market demand, stable customer relationships and their increased investment in smart product lines, and the rapid iteration and adoption of GenAI and LLMs. So this drove a positive response from the consumer electronics industries toward intelligence trends. For Tuya, our unwavering commitment to the developer platform model, combined with our unique software-and-hardware integrated approach and customer-centric product expansion strategy, so that has amplified these industry tailwinds, helping both of us and our customers achieve solid business results.

In 2024, the number of IoT PaaS premium customers grew by 11% to 298. Our revenue dollar expansion rate (DBNER) exceeded 122% at the end of Q4, marking five consecutive quarters above 100% and three consecutive quarters above 120%. Our products and service offerings provide customers with all the necessary technologies and software to efficiently create competitive smart devices and bring them to market. So the DBNER metric reflects our continued ability to enhance our customer competitiveness through Tuya's technology leadership. As a B2B company, our top 10% revenue-contributing customers maintained a retention rate of about 97%, underscoring the strong stickiness of our neutral, open, and scalable technology platform.

Our strategic focus on key accounts has driven efficiency improvements too, evidenced by an about 37% and 40% year-over-year increase in average revenue per customer and average gross profit per customer, along with an about 47% increase in company-wide revenue per employee. At the same time, the scalability of the Tuya ecosystem and our strong market positions have freed us from rigid marketing and sales expenditures, allowing us to dynamically allocate resources, strategically promote

new products, capabilities, feature set, precisely target key markets, and expand our influence as well. Consequently, our sales and marketing efficiency improved by about 40% year over year.

In the PaaS business, 2024 witnessed a more diverse and dynamic developer base, contributing to solid year-over-year growth across all categories. Our product category structure has become increasingly balanced and diversified, aligning well with the trend of customers expanding their product lines. In a highly fragmented and dispersed global consumer electronics market, the widespread adoption of technology continues to drive innovations across diverse product categories. The increasing variety of smart devices is fostering a more comprehensive approach to Spatial Intelligence, enhancing user convenience and comfort, ultimately progressing toward the vision of an interconnected and interactable intelligent ecosystem.

We are also pleased to see that our Smart Solution business model effectively aligns with the needs of top-tier customers, achieving about 58% year-over-year growth in 2024. For instance, in response to the French government's energy subsidy policy, we assisted and helped our French customers in becoming among the first to meet the country's energy efficiency subsidy standards. This incentive program is set to help millions of French households achieve green energy savings. At this stage of smart technology development, whether in consumer electronics or industry-specific applications, a rich ecosystem of smart devices is essential for top-tier customers. In this regard, Tuya possesses a significant advantage over other players throughout its expansive developer ecosystem, and Smart Solution further enhances our ability to support customers, strengthen engagement, and boost their market competitiveness.

And in the same time, we remain committed to building a robust developer ecosystem. At the end of 2024, the number of registered developers on our platform reached around 1.32 million, with over 1.07 million SKUs of smart devices developed on Tuya's platform, spanning more than 3,000 product categories. We continue to foster an extensive ecosystem by, for example, integrating with Google Home APIs to create a seamless smart home experience and collaborating with Chery to establish a new "vehicle-home interconnectivity" ecosystem. At the same time, we are dedicated to expanding Tuya's global influence, positioning ourselves as a reliable partner for customers and developers worldwide. Our HEMS, the Home Energy Management System Solution, has recognized in the United Nations Global Compact report, "20 Best Corporate Sustainability Practices in 20 Years," highlighting Tuya's commitment to sustainability. Additionally, we achieved an MSCI ESG rating of "A" and a Wind ESG rating of "A," too and we were included in the S&P Sustainability Yearbook China Edition and so on.

Next, I would like to discuss Tuya's opportunities in Device & Edge AI. As a technology-driven company, Tuya fully embraced GenAI and the LLMs in early 2023. In Q4 of 2024, we launched the Tuya AI Agent development platform, integrating all major large language models, including ChatGPT, Qwen, DeepSeek, Doubao, Le Chat of Mistral, Gemini, Amazon Nova, and Claude, etc. Tuya's LLM-agnostic approach eliminates the complexity of developing smart devices and applications from the ground up, providing developers with a crucial middleware layer that bridges LLM capabilities with real-world applications. Developers can flexibly choose the most suitable AI model based on their business and market needs while leveraging Tuya's template library or customized solutions to develop AI devices and applications. This philosophy aligns with Tuya's cloud-agnostic strategy, ensuring customers do not have to worry about the compatibility and sustainability of cloud services, IaaS, device types, or hardware architectures.

Those agnostic capabilities provide Tuya developers with unparalleled flexibility and adaptability, distinguishing us from single-category solutions. Moving forward, we will continue to prioritize AI devices and spatial intelligence applications, focusing on areas such as audio-video interactions, efficiency optimization, and decision-making automation. Audio-video AI enhances user-device interaction by enabling advanced content input and output mechanisms, while efficiency and decision-making AI help end-users optimize their smart devices and usage strategies to meet personalized and differentiated needs. We will also continue exploring the application of Tuya's Spatial LLM in energy management and other spatial intelligence scenarios.

2025 will mark the breakthrough year of Device & Edge AI. We plan to integrate AI capabilities across all categories within the Tuya Developer Platform, ensuring that every Powered-by-Tuya device is AI-enabled by default in the future. Together with global developer partners, we will explore various innovations and scalable applications for AI device, continuously shaping a [corrected]vibrant global AI + IoT developer ecosystem.

Looking ahead, intelligence will evolve through the integration of software and hardware, constructing differentiated scenarios throughout [corrected]interconnected smart devices and meet the customized needs of individuals, households, and spaces. The industry remains in a penetration-driven phase, with a vast and promising total addressable market. To achieve sustainable growth, we will focus on the following key areas:

First, we will continue to expand global market penetration. We will leverage a combination of PaaS, SaaS, and Smart Solutions to deepen our global reach, particularly in Europe, Latin America, and the Asia-Pacific region, while increasing customer use cases. For large enterprise customers, we will offer Cube, our smart private cloud solution, to help them build secure and scalable enterprise-level smart platforms.

Second, advancing AI devices and applications – We are committed to leveraging Gen AI and LLMs to significantly enhance smart product experiences, driving product competitiveness and delivering greater value to end users. We will continue to innovate across high-potential markets such as smart companionship, smart outdoor, smart energy, and smart spaces, complementing and accelerating smart device penetration by AI applications.

Third, throughout our integrated hardware-software Smart Solutions, we are helping top-tier customers to speed up product launches and establish differentiated competitive advantages cross different categories and regions, directly increasing end-market penetration and delivering greater and more sustained value.

Fourth, maintaining a customer-centric approach. We aim to serve high-quality core customers efficiently, supporting their business growth, increasing customer stickiness and repeated purchases, and ultimately enhancing our operation leverage and efficiency.

Last, continue to build our global developer ecosystem. We continue to iterate and refine Tuya's AI Agent development platform, empowering developers worldwide to create customized AI devices and scenario-based applications easily. Additionally, we will leverage Gen AI tools to improve development phase efficiency as well.

Finally, let's address some frequently asked topics from the capital markets regarding to internal operational efficiency, share-based compensation expenses, and dividends.

Throughout 2024, our total headcounts have remained at about 1,450 employees, reflecting an about 12% reduction from 2023. And by Q4 2024, our average revenue per employee had exceeded early 2022 levels by more than three times. Over 70% of our team consists of R&D, technology development, and product personnel, who drive rapid product iterations across Tuya's business lines and prepare for the next generation of opportunities. Notably, Tuya's revenue growth is not dependent on heavy investments in sales and marketing, which has been a key factor in our stable and continuously improving profitability. We are committed to further improving operating leverage, while our net profit structure and quality will become even more sustainable and organic.

Regarding share-based compensation expenses, the current quarterly accounting expenses primarily stem from the legacy granted and issued ESOP in a higher evaluation years ago, which has become amortized in quarterly according to their vesting schedules. These expenses are unrelated to any recent equity grants. As these legacy awards are gradually fully vested, SBC

expenses will see a substantial decline starting in 2025, leading to a visible reduction in their accounting impact in our income statement—an improvement that was already evident in Q4 of 2024.

Earlier this day, ahead of this earnings call, our Board of Directors approved the second dividend for 2024, totaling about \$37 million. Given our robust non-GAAP margin – normally non-GAAP metrics reflect the direct results of operational decision-making, excluding external factors unrelated to our business model. So those non-GAAP margin and strong financial position is the base we offer for the dividend, with over \$1 billion in net cash and seven consecutive quarters of positive operating cash flow from Q2 of 2023 till now, we believe that Tuya is well-positioned in sustain long-term growth throughout its competitive moat while also rewarding our shareholders who have demonstrated steadfast support. We remain committed to driving growth in both our global business and capital markets.

Overall, 2024 has been a [corrected]pivotal year for Tuya—marking our first year of operational profitability, the execution of our AI strategy, and a breakthrough in our shareholder structure. During this strategic upgrade, we have been fortunate to experience multiple dimensions of progress and transformation—whether in achieving operational profitability, expanding our global footprint, or optimizing our international shareholder base. Notably, our partner with 65EP, a subsidiary of Temasek, as a strategic investor has positioned them as Tuya’s largest institutional shareholder. Furthermore, our achievements have been strongly recognized by the market in early 2025. I believe this success is rooted in Tuya’s global presence, its unique hardware-and-software integrated business model, and its strategic focus on the developer platform.

Thank you, everyone. Operator, we can now begin the Q&A.

Question and Answer

Operator

Thank you. We will now begin the question-and-answer session. (Operator Instructions) We will now take our first question from the line of Timothy Zhao from Goldman Sachs. Please go ahead, Timothy.

Timothy Zhao

Goldman Sachs, Analyst

Thank you, management for taking my question and congrats on the very strong to end the year of 2024 and I think your presentation is very helpful. I have two questions here. One is that on AI impact in your Smart Solutions business, could management further elaborate on what kind of usage scenario that you are seeing?

Yi (Alex) Yang

Co-Founder, CFO & Director

Yeah, thank you for the question. For the AI, what we see here is that this will be a really good year for the AI and we'll consider it as a first year that we can really turn the AI devices into reality. What we see the priority of the AI opportunities on the device side, so we'll start with all the audio and video interaction devices, which means that to bring a new way to have the people interact through the audio and video to the device. So that would be one thing. No matter its some use cases where we show that in the last quarters like the pet feeders, like the bird feeders and the pet-related appliances and some control panels on the wall with the screen as well. So that will be one thing.

And the second thing is that all those types of analytic type of devices that need a complex decision. One significant use case is energy solution. Because for comprehensive energy solutions, you need to be able to read through dozens of variables from different type of devices and from the outside factors like the weathers, like the utility data, etc. and then make some adjustment and automatically and dramatically making new decisions to operate the device in different ways. So the AI definitely will help in that part. So that will be something.

And also what we see is a very interesting and new type of stuff will be the all type of toys. We found that the kids will be the perfect adapter for AI because they don't have any stereotype about any existing technology, they grab anything as fashion new, they just easily duck in. And since January after the CES, we really got plenty of customers reaching out to us, bringing different ideas that how they can integrate AI into toys. That would be some of the incubating categories we started catching up. But I believe there will be more booming starts throughout the entire year or even in the next couple of years. While the AI starting from the very fundamental stuff like the LLM someone can bring an easier approach to the market to activate all the new ideas. While the barrier become low, and you have thousands of thousands of companies and the developers join in. That will become a robusted market what we're looking-forward to do. There might be thousands of different type of things coming after.

Operator

Timothy, do you have any follow-up questions?

Timothy Zhao

Goldman Sachs, Analyst

Yeah, my second question is regarding your margins. Just wondering, I think with the AI enhancing the demand for IoT, what is the unit price like trend over time and how that will impact your margin? I think it's more on the gross margin level. And can you also talk

about your OpEx given I think you have been investing on AI and operating efficiency and the OpEx level has been quite high. Just wondering how do you think about your operating leverage into 2025? Thank you.

Yi (Alex) Yang

Co-Founder, CFO & Director

Yeah, so the first one is that the AI will be still in a very early-stage. We're not making a final decision, we didn't make-up the final call about how we're going to commercialize AI. We try different type of commercial use cases and in one word is that, we're starting to deploy the AI into all three business models we have, including the PaaS, the SaaS and solutions. We will offer the AI in different way based on what type of needs it is. That will be one thing. And sometimes it will be a new offering that we provide to the market. We will reprice that as a new product. For that part, and the margin will depend on not only the cost, but also depends on the demand. This depends on what type of reasonable pricing we'd like to put into the market to scale it.

And another part is that some of the AI, if we think that we want to put that as the default features that enhance all customers and to improve their competitiveness. We'll integrate that into our existing PaaS solution too. The margin impact, I think that in the short-term, and I don't have visibility for that because the scale may not be growing that significantly to influence our overall margin. That will be smaller pie at this moment. And in the long-run, I believe that AI will bring more values, but we'll not commit it to when. Because for sure that the focus for us, I mean, the priority for us is always scalability. Yeah, that would be one thing.

And second thing about the OpEx, like I mentioned earlier, we're starting to invest in the AI once the Gen AI occurs back to early of 2023. It's not a new investment for us. Throughout the past two years, we have already relocated our resources internally and improved our talent structures in some roles to be capable of building AI already. Right now, there are lot of departments in my company that all AI ready now. Which means that I don't have to recruit the team, to rebuild the team all over again. It's already been there. And for this year, we will slightly increase some of specific application investment by the demand of the market slightly. And at the same time, we're looking forward to seeing what will be the right opportunity or right type of way that we can market it in a better efficiency since that it comes with a new concept, you better make some noise, but that type of impact will say that it's very controllable. I'll say that will not improve the OpEx significantly. It will be in a very manageable level.

Operator

Thank you. We will now take our next question from the line of John Roy from Water Tower Research. Please ask your question, John.

John Roy

WaterTower Research, Analyst

Excellent year last year very well done. So I was wondering about SaaS and its growth prospects. Do you see that as something that could really change the landscape or is that just more of an add-on?

Yi (Alex) Yang

Co-Founder, CFO & Director

Yeah, that's a good question. Thank you for that. The first one is that SaaS is based on the base of the total deployment of our devices. So that will be a later business models versus the PaaS, which means we need to enlarge and scale the PaaS. And on top of that we can grow more SaaS. That will be one thing.

And second thing is that we're facing a structural improvement in the SaaS model, which means that we try to increase the portion of the recurring models in the SaaS type, not only the software base, but also the recurring software base. That would be the second thing. And for that part, I'm not worried about the growth. I'll pay more attention on the stickiness of the customers, whether they can use

that type of thing as long as they can use that. So the payments, the continually annually payment will be a very strong base for us. That will be the second thing.

And the third thing is that the within the PaaS, so there will be one portion of that is for the commercial software. So it's not consumer facing one. For the commercial one, in the past three years, the major market that we're starting to do this business line is in Asia and China. Because that's within COVID period, so which means that it brings us difficulty to be able to incubate new business across the global basis. And starting from late last year, we're starting to duplicate that use cases in different countries. We try to bring that into global market. We already have some positive progress there, no matter in Latin America, Southeast Asia and Europe too. For that part, right now, we are approaching to a bigger total addressable market on a regional basis and we really found the duplicatable applications or products that are proving to work out and we already have a customer base that's applied with recurring models. For the SaaS, I believe that will be our long-term growing business line. We are not looking to have any short-term surprise or short term significant improvement, but for the long-run, maybe after five years, that will be a very, very joyful thing for us.

John Roy

WaterTower Research, Analyst

Great. Thank you for that. So obviously, the dividend is very nice, and you have a pretty significant cash position. What is your view on the acquisition front? Is that something you're actively watching? How are the prices in that market?

Yi (Alex) Yang

Co-Founder, CFO & Director

I think you mentioned about M&A, right?

John Roy

WaterTower Research, Analyst

Yes, right.

Yi (Alex) Yang

Co-Founder, CFO & Director

Yes, M&A is always an open option for us. And we keep screening what type of companies or partners can be our extension either to extend our scope of coverage of different type of scenarios or to be a vertical solution, a more vertical solution provider for specific industries. We keep screening on that. And yeah, I think that's an option for us. I think the key part is that the first one is that no matter with or without acquisition, those guys should be our developers. And the first priority is to have a very strong global developer ecosystem. I think that will be our major focus. At the same time, anyone maybe within the ecosystem that can show a better potential no matter, like I mentioned, it's that horizontally extend our scope or vertically that improve our vertical industry insights. For that part, we can easily identify that. We'll keep it open. And we'll keep spot anyone to help us to find some interesting target too. If you have anyone, introduce to me.

John Roy

WaterTower Research, Analyst

Will do. Thank you so much. And again, congratulations.

Operator

Thank you. We will now take questions from Kai Xiao of CICC. Please ask your question, Kai.

Kai Xiao

CICC, Analyst

This is Kai Xiao from CICC Research and congratulations for the strong quarter. My first question is regarding the IoT PaaS. What's the current downstream demand for IoT PaaS and which countries and categories you think have more potential? And how can we outlook the gross margin? And the next question is regarding the high-quality customers. We see the number of customers have very strong growth. What do you think the further potential for the company to further expand the high-quality PaaS customers in the future? And will Gen AI help in the acquisition of more high-quality customers? Thank you.

Yi (Alex) Yang

Co-Founder, CFO & Director

Thank you for the questions. The first one for the PaaS and as we can find in our business, it's very strong showing that we have a very balanced structure on the business. No matter it is on the regional side or on the category side. Right now, the business comes from over 3,000 categories on the Tuya platform. We didn't rely on any single category, which means that we're quite diversified in the category side. That's what I mean whatever type of new booming stars in the smart devices market occurs, for sure that there are someone making that in Tuya platform, in Tuya ecosystem, not from somewhere else. For sure that we will cover any new opportunities.

And on the regional side, right now, we're very balanced too. The largest regional market in Europe only covers slightly over one-third of 35 of our business and on the end user demand. And for all other countries, North America, Latin America, Asia and Australia including China domestic, so they are quite balanced. We didn't rely on any single region market too, which bring us a very good barrier or very good protections for any type of change happening on the geographic and scenarios. So that would be one thing for the PaaS.

And for the second question. I think the major customer here is that right now, for the first 10 years of establishment of this company, and there are larger portion of the ecosystem come from the consumer field. What we found here is that two extensions on the customer side. The first one is that for the past three years, we have more and more customers and use cases come from non-consumer fields. No matter it's commercial one, industrial one, and that type of things. And also in the company, we have new business lines, just focus on that part. That will be one thing. That will be total extension and some new type of customers from that part and including the telecom carriers. We continue to have new telecom carriers partners coming in. That would be one thing.

And the second thing is that exceeding from the device-based stuff. In the near future, we believe there will be more and more spatial solutions being needed. And the spatial solution providers usually be a different type of company too. And for that, no matter it's for like the property manager, warehouse manager and logistics. So those can manage some type of space, the house, the building, the warehousing or some asset too. Those type of solutions before AI technology happens, they don't have a comprehensive right type of solution to cure the pinpoint. The spatial models and spatial solutions we design can meet that, so that can help us to open another door too. So that will be what we call it the new growth momentum for us. That's it.

Operator

Our next question comes from the line of Yang Liu from Morgan Stanley. Please ask your question, Yang.

Yang Liu

Morgan Stanley, Analyst

Okay, thank you for the opportunity to ask questions. Two questions here. The first one is on the outlook of the revenue structure because we observed in the past few quarters that IoT, SaaS and other growth recovered meaningfully. And while the smart device distribution growth has been very volatile, so this kind of a mix change is very critical to the overall gross margin. I would like to hear

your view in terms of the three business lines and relative growth rate going forward and whether it will have meaningful impact on the blended gross margin? That is my first question.

And my second question is regarding the what's your view on the competition in the AI for the IoT solution provider? Do you see more hyper-scalers who would like to develop IoT hardware themselves or you think is it a booming market with a lot of smaller product development companies in the market as Tuya can continue to add a lot of value to those customers? Thank you.

Yi (Alex) Yang

Co-Founder, CFO & Director

For the question, I think that our three business models, because they come in with a totally different approach to the customers. Overall, the margin level of each of the business models will be kind of stable. For the PaaS, we believe that the overall margin for PaaS will remain at around 45%, we think that will be reasonable or slightly over 45%. And for the SaaS, because it's software based, I think that over 70% will be remained.

And on the solutions side because we'll follow the hardware game rules. While you scale the volumes, the customers scale the volume too and sometimes you have to subsidize some of the profit to the customer. We believe that on the solutions side, maybe we scale it, we double that or we scale that in a bigger base that maybe the margin of solutions will slightly decline a little bit, but not that much. We think that we'll continue to maintain the solutions margins over 20%-21%. So that will be overall the margin or the nature of the margins underneath each of the business models. And put that together and what we found is that so the PaaS will continue to provide a stable growing base for the entire Tuya business because that will be essentially everything that the customer needs to purchase. And SaaS, like I mentioned earlier to John's question, so we think that the SaaS will be more long-term growing curve for that. So we're not in hurry. We continue to enlarge the device base and customer base and we deploy those services on top of that. And convert more of them to pay the recurring revenue. That will be a long-term journey, but remaining a similar growth with the PaaS, that's what we are expected to.

And because solution come from PaaS customers should they calling out for our solution rather than the development toolkit from the PaaS side. So solution is that we convert to more and more customers' demand directly from a PaaS base. For that part, the solution might grow faster. And while solution became a larger pie of my total revenue, and so general gross margin rate, gross margin, GPM we believe that in the long-term will slightly decrease a little bit, we think that would be reasonable. I mean, because I have a bigger pie of the solutions side, will come with a lower margin compared with other two business models. For that part, we think that will be good. But that's not the problem for us. I believe that the key to evaluate the gross margin is that we need to breakdown each of the business model and tell the value of that. Whether that values reflect to the right margins as that business models and I need to compare that business model to the industry level. The SaaS is compared to other SaaS company or other SaaS peers. And PaaS is compared to PaaS too. So yeah, that's the point I'd like to try to make. It's a very stable business model and structure will start to change slightly.

Yang Liu

Morgan Stanley, Analyst

Yeah, thank you. How about the second question, what is the outlook for the competitive landscape in the AI for the IoT?

Yi (Alex) Yang

Co-Founder, CFO & Director

Yeah, I think I really covered part of the question right. I think right now, the good part for AI is that right now is in a very positive and active momentum for the market, not for the capital market, but I mean, for the hardware industry. And we have a lot of movers as either designers or manufacturers or solution providers. And so right now, we process three, like mentioned is either the video-audio-interactive and all the decision-making analytics one and the toy. But we believe that we'll be at least thousands of more vertical use cases we're coming from. It's very early stage and this year is that we got so many players on the field to try different type of ideas.

What we need to do is that we offer them a toolkit to easily turn their ideals into tool. I think that will be the unique value that Tuya provide. And that's why we have such a successful developer ecosystem to let them get away from to everything in house, we offer them a shortcut to testify their ideas. I believe that this year will be kind of very starting line for the AI device that you can find millions of new devices out there. A lot of people trying and some will prove to work out and starting to scale that, maybe some not and will redesign that. So yeah, I think that will be the momentum we're looking forward to see. And what we do is that just like I mentioned, we continue to lower the barrier for anyone try to get in.

Operator

There are no additional questions at this time. I'll hand back to the management team for any closing remarks.

Reg Chai

Investor Relations Director

Okay. Thank you again for joining our call today. If you have any further questions, please feel free to contact us or request through our IR website. We look forward to speaking with everyone in our next earnings call. Have a great day today. Thank you.

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