

Current and **Future R&D** at **NTT DOCOMO** for the **5G Era**

Open Innovation with 5G Co-creation Partners

R&D Also on the Front Line! Co-creating Corporate Solutions with “TOPGUN”

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In October 2017, NTT DOCOMO began its “TOPGUN™*1” initiative to generate solutions in a three-way partnership between DOCOMO’s R&D division, corporate sales and marketing division and its customers. This initiative aims to create real solutions to customer issues by having R&D engineers actually go to the front line with corporate sales and marketing staff to uncover the latent needs of customers, verify business potential and commercialize services all at once. Through TOPGUN, DOCOMO R&D is accelerating the co-creation of solutions for the 5G era.

1. Introduction

To date, NTT DOCOMO has taken initiatives to create corporate solutions using its R&D assets*2. However, due to the ongoing diversification and complexification of customer and social issues, and the increasing number of ICT players intensifying the competitive environment, the importance of quickly creating solutions to generate revenue, by

understanding the front line to uncover latent issues and needs, has reached a new level. To address these circumstances, NTT DOCOMO launched the TOPGUN initiative to drive speedy co-creation of solutions through stronger collaboration between R&D and corporate sales and marketing divisions, and a three-way partnership with customers.

This article describes the TOPGUN initiative by DOCOMO’s R&D to generate new value in the 5G era.

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*1 TOPGUN™: TOPGUN and the TOPGUN logo are trademarks or registered trademarks of NTT DOCOMO, INC.

*2 Assets: Specifically, technology assets.

2. TOPGUN Accelerating Co-creation of Solutions

2.1 The TOPGUN Objective

DOCOMO’s R&D and corporate sales and marketing divisions form small elite teams to solve issues by quickly uncovering issues and needs, creating solutions, verifying business potential, and commercializing services to generate revenue all at once in three-way partnerships with customers. This initiative also entails the establishment of maintenance and operations team, packaging as a corporate solution service and deployment nationwide. These are the objectives of TOPGUN (Figure 1). This initiative aims to accelerate +d^{*3} co-creation, and achieve Declaration 4 “Industry creation” and Declaration 5 “Solutions co-creation” in the DOCOMO

Medium-Term Strategy to 2020 “Declaration beyond.”

2.2 Creating Solutions to Issues

1) The TOPGUN Business Stages

TOPGUN is an initiative to create solutions to issues that puts emphasis on uncovering issues, proposing hypotheses and verifying business potential. This entails a team consisting of R&D and corporate sales and marketing personnel actually going to the front line to understand customer issues and uncover latent needs (business stage (1)). Then, the team will set a problem-solving hypothesis and Key Performance Indicators (KPIs)^{*4}, and conduct field trials to verify the hypothesis in the customer’s actual location (business stage (2)). When KPIs are achieved, and when a maintenance and operations team that can withstand large-scale

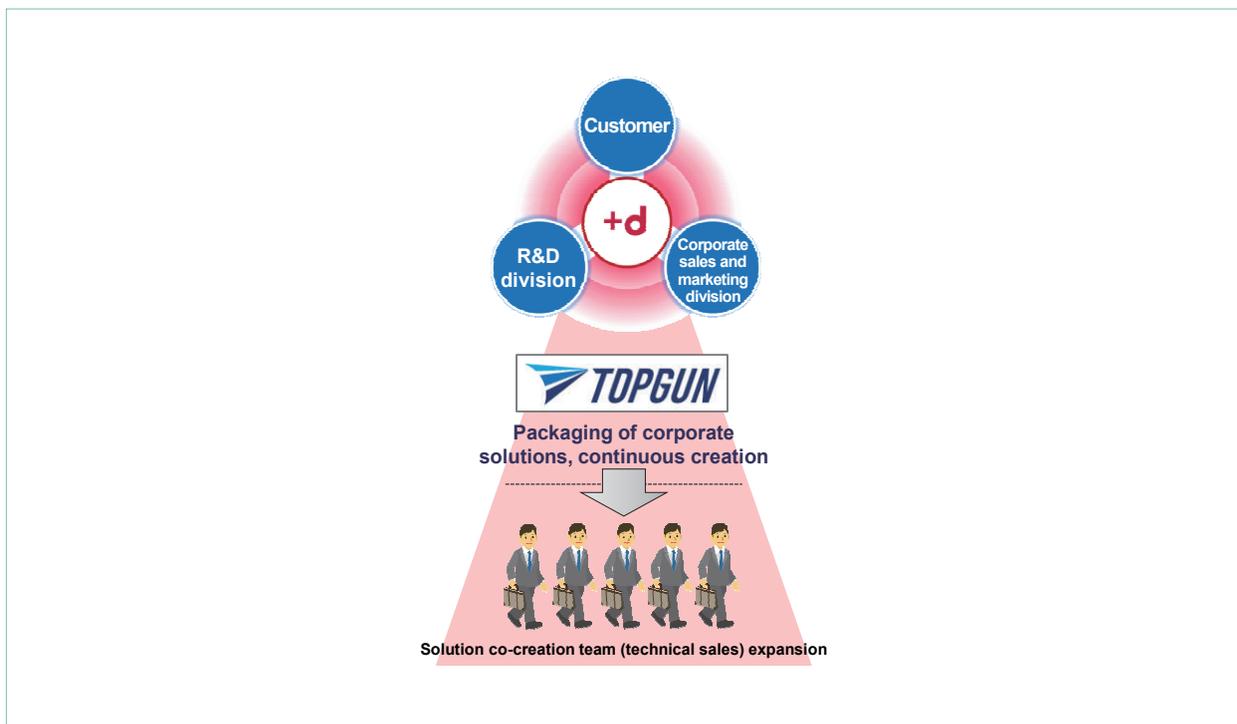


Figure 1 What is TOPGUN?

*3 +d: Name of the NTT DOCOMO initiative for creating new value together with partner companies.

*4 KPI: The main indices for measuring user or system performance.

deployment is set up, the solution collaboration team (technical sales) will deploy the solution as a corporate solution nationwide (business stage (3)). This flow is described in **Figure 2**.

2) Partnership with Nationwide Corporate Sales and Marketing

The TOPGUN collaboration between R&D and corporate sales and marketing does not stop in our headquarters. Gradually increasing in number, corporate sales and marketing staff from regional offices and branches all over Japan can also actively participate in the TOPGUN initiative to solve the issues faced by their clients such as local companies and municipalities. The initiative endorses sharing of TOPGUN related information nationwide through close collaborations between our regional offices and branches, and provision of office

space in our headquarters so that regional office and branch staff can hold discussions with HQ staff. Active and deep interactions between the R&D division and corporate sales and marketing division of regional offices and branches, is another key characteristic of the TOPGUN initiative.

3) Expected Results

A number of results can be expected from R&D and corporate sales and marketing divisions personnel going to the front lines and linking needs with seeds*5, as described below.

- Find solutions quickly and make improvements on the spot by rapidly and simultaneously verifying problems and solutions and sharing objectives with customers, as new issues are discovered through testing.
- Create solutions to customer issues with

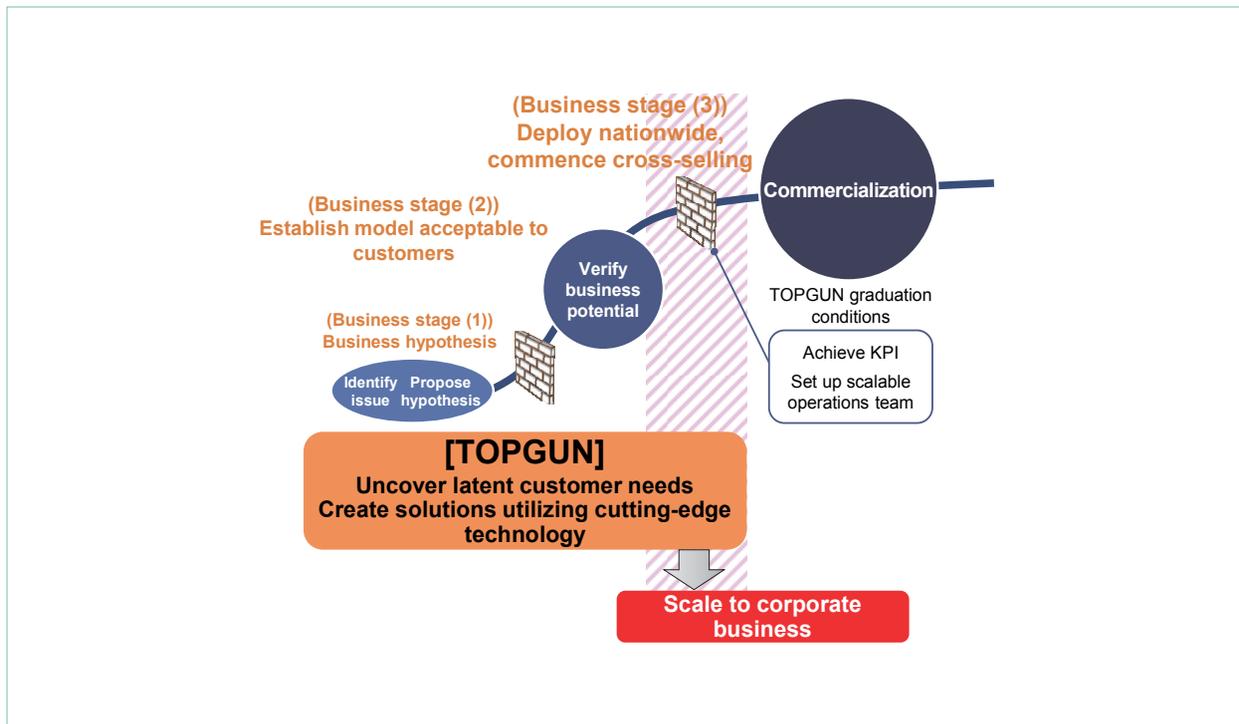


Figure 2 The TOPGUN business stages

*5 Seeds: Technology or know-how that could lead to new business.

cutting-edge technology by changing technical potential into customer value.

- Flexible creation of corporate solutions tailored to various industries and fields to meet various customer needs, and nationwide sales expanded through corporate sales and marketing teams throughout Japan.

3. Current Status of the Initiative

In ten months since TOPGUN began, it has entailed ten projects (as of July 2018) (Table 1). The following describes two of these projects.

3.1 Location Net

Location Net^{®*6} is a service that enables detecting

and managing location information of people or things with a Bluetooth[®] Low Energy (BLE)^{*7} tags (Figure 3). We confirmed the effectiveness of this system by testing child monitoring in collaboration with Kobe city, and testing location management of child strollers and wheelchairs in collaboration with All Nippon Airways (ANA). Aiming to further expand Location Net usage, R&D project members and corporate sales and marketing division staff are currently traveling to various parts of the country and performing field trials in various fields such as elderly monitoring, and staff management in facilities such as factories. Photo 1 shows pasture cattle headcount management, one of the field trials we have performed. Based on these trial results, we aim to expand Location Net

Table 1 TOPGUN project list

No.	Project name	Overview
1	Location Net (Section 3.1)	Location-detecting service/solution to easily manage location of people and things etc. using BLE tags
2	Image recognition platform	Platform to achieve business efficiency and improved service value for partners, using automatic image recognition
3	Big data analysis	State of the art analysis and solutions combining our corporate customers' data with NTT DOCOMO's data
4	Robot for teaching programming "embot" (Section 3.2)	Teaching kit for kids to learn programming by creating a robot out of cardboard and controlling it with visual programming, while having fun
5	Sports scene sensing	Solution for athletes and sports enthusiasts which visualizes distance moved, maximum speed, the amount of exercise such as calories consumed, and trajectory of movement
6	Touch conversation	App for visitors to Japan to quickly translate language by touching fixed phrases
7	AI agent	AI solution for conversation, content usage, and device operation through natural dialogue with various objects
8	Ad hoc communications	Application that makes use of short range communications technologies between terminals without using a telecommunications carrier network
9	Vacancy visualization	Solution that visualizes toilet or meeting room vacancy using sensors
10	Mobile camera platform	Monitoring and surveillance solution which uses low-power mobile cameras

*6 Location Net[®]: A registered trademark of NTT DOCOMO, INC.

*7 BLE: An extension function of Bluetooth[®], and a standard defined for low powered devices as part of the Bluetooth 4.0 standard. Bluetooth is a short-range radio communication specification for radio connection of mobile terminals, and is a registered trademark of Bluetooth SIG, Inc. in the United States.

business by packaging solutions for various fields and applications with business potential and deploying them nationwide.



Figure 3 Location Net Service



Photo 1 Field test of pasture cattle headcount management

3.2 Robot for Teaching Programming “embot”

embot^{®*8} is a programming kit that helps elementary school students learn programming thinking and logical thinking by simple assembling of a robot from cardboard and a printed circuit board that they then operate with a special programming app that runs on a tablet device (Photo 2).

Interest in programming education has increased since it will become compulsory in elementary

schools from FY 2020, but many primary school teachers are troubled by teaching it as they have no such experience. Thus, using embot, the TOPGUN team has been holding hands-on programming classes and demonstration lessons around Japan, and is currently working with teachers to verify lesson management know-how to get children interested in programming and ways to include it in the primary school curriculum. The hands-on programming class is shown in Photo 3.

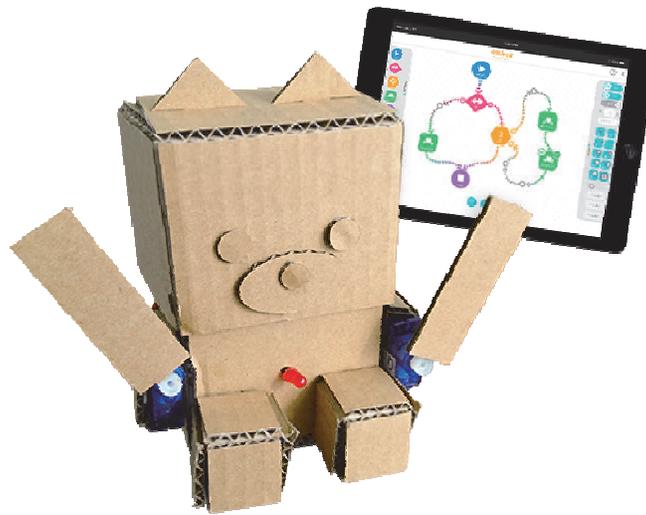


Photo 2 The “embot” robot for teaching programming



Photo 3 Hands-on programming lesson

*8 embot[®]: A registered trademark of NTT DOCOMO, INC.

The commercial launch of embot is planned for September 2018, and the programming education package which includes an embot set and lesson support materials will be prepared for education committees and programming classes. The nationwide TOPGUN team plans to sell the package all over Japan (as of end of July 2018).

4. Conclusion

This article described DOCOMO R&D's active role in the TOPGUN initiative. Going forward, we believe we can create a wide range of solutions by matching DOCOMO's technological assets with the

issues and needs of customers through TOPGUN, and plan to launch at least ten new projects per year towards 2020. From among these, we will speedily commercialize effective and profitable projects and develop them as businesses through our nationwide corporate sales and marketing channels to solve many of our customer's issues.

Through the TOPGUN initiative, DOCOMO R&D will go to the front lines and use the technological assets it has fostered to the fullest, and continue the challenging work of creating greater value to solve customer issues and expand NTT DOCOMO's businesses.