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## NTT DoCoMo and the New Global Communications Culture



**DR. KEIJI TACHIKAWA**  
President & CEO,  
NTT DoCoMo

*NTT DoCoMo, Japan's premier mobile communications company, continues to raise the bar in innovation, setting the pace for the development of wireless communications in the 21st century. The company has been heralded as a model for wireless innovation, expanding into non-voice services, wireless internet, and data and video, among others.*

*On November 12, 2002, the Center on Japanese Economy and Business, together with the Columbia Institute for Tele-Information (CITI) and the student-run Japan Business Association (JBA), cosponsored a distinguished lecture featuring Dr. Keiji Tachikawa, President and CEO of NTT DoCoMo. In his presentation, Dr. Tachikawa described a wireless strategy for the new century. He examined the creation of highly efficient corporations and the importance of new business models, looking at the impact of wireless communication on culture and society. This report is a summary of his presentation followed by excerpts from the question and answer session.*

Administered jointly by the Center on Japanese Economy and Business and the student-run Japan Business Association at Columbia Business School, the Distinguished Lecture Series brings Japanese and American business executives, government officials and scholars to Columbia to speak on topics concerning the Japanese economy and its business systems and the U.S.-Japan economic relationship.

## Growth of the Global Wireless Industry

Today I would like to present my views on how mobile communications might impact society in the 21st Century. The number of mobile phone subscribers in the world has increased almost ten times during the six-year period from 1995 to 2001. However, the pace of growth varied significantly between different regions. For example, the subscriber count in Europe and Japan achieved a 14-fold increase during this period. On the other hand, the increase in North America over the same period was only 3.8 times, from 33.8 to 128.4 million subscribers (see Figure I). Today, there are more than 900 million mobile phone users across the world.

I would like to compare the cellular phone market in Japan and the United States with other principal markets in the world. As Figure II shows, in terms of the subscriber count, the United

States is the second largest market in the world after China. Japan is the third largest. However, in terms of the penetration rate, today only 46 percent of the American population use cellular phones and only 54.4 percent in Japan, which are relatively lower than other markets in Europe or Asia. This implies that the cellular phone industry is still growing at a rapid pace on a global scale and both Japan and the United States have plenty of room for further expansion.

Let me now compare Japan and the United States. As you can see in Figure I, Japan's growth chart is steeper. In Japan, the number of mobile users grew rapidly from 1.7 million in 1992 to 74.8 million in 2001.

In terms of the penetration rate, Japan caught up with and exceeded the United States in 1995, two years after the launch of second-generation digital systems. We were able to achieve rapid expansion due to several reasons, such



FIGURE I

as our continued effort to improve the handset performance and the network quality, as well as tariff reductions.

At the end of March this year we had about 75 million mobile phone users in Japan. The user pace of mobile phones, which has a history of only 14 years, is already greater than the landline telephones, which has a history of more than 110 years. Another notable trend in the recent market is the dramatic spread of the internet. At the end of March 2002, there were 52 million wireless internet users in Japan, almost double the number of fixed line internet users.

### DoCoMo's Growth Strategies for the 21st Century

First, I would like to tell you my views on the future directions of mobile communications. Traditionally, mobile communications business has been led by voice. Going forward, we would like to expand our service areas to non-voice services as well, the so-called "Mobile Multimedia" services. Furthermore, we aim to provide a service to "anything mobile." This means not only people, but anything that moves could become a potential user of mobile communications. Our strategy is to shift from domestic to global operations to expand our business territories. These three major directions can be summarized by three key words: multimedia, ubiquitous and global.

How will mobile communications develop in the future? Future mobile services can be divided roughly into three groups depending on the user of the service. They are

<b>Subscribers &amp; Penetration rate by Nation</b>			
<b>Subscribers (millions)</b>		<b>Penetration rate (%)</b>	
China	144.8	Italy	86.1
USA	128.4	Hong Kong	83.4
<b>Japan</b>	<b>74.8</b>	Finland	82.2
Germany	54.1	UK	75.3
Italy	49.7	Singapore	65.4
UK	44.9	Germany	65.2
France	35.9	South Korea	60.6
South Korea	29.1	France	60.3
Brazil	29.0	<b>Japan</b>	<b>54.4</b>
Spain	28.9	USA	46.0

Source: Global Mobile (December 2001)

**NTT DoCoMo**

FIGURE II

*The potential demand for mobile services in 2010 could be enormous if services can be applied to objects other than human beings.*

person-to-person, person-to-machine and machine-to-machine communications. As for person-to-person services, the growth of usage is expected to come from mail and video-phone services rather than conventional voice services. The growth of data and video services implies the expansion of person-to-machine communications. The traffic from person to servers to receive electronic newspapers, electronic advertisements and music is projected to increase dramatically.

In addition, electronic settlement services will also emerge and mobile devices could replace wallets. Furthermore, as IT penetrates deeper into society, communication between machines and computers to monitor or control other devices from remote location will be commonplace in the near future.

We believe many new services will be created in five key areas. They include the Internet, location positioning, information distribution, remote monitoring and remote control, and settlement. The Internet is already used, especially i-mode. With respect to positioning, we are already providing personal navigation or car navigation access in Japan. Media distribution includes music distribution or cinema preview of the user and we provide advertisements through the Internet and the wireless Internet. Remote sensing control includes POS for vending machines and monitoring of the environment, which is an important issue. As for settlement, we are now very eager to develop a new mobile e-Commerce service using mobile communications.

Using the Japanese market as an example, the potential demand

for mobile services in 2010 could be enormous if services can be applied to objects other than human beings. In 2010, the human population is estimated to be 120 million, but there are many other things that can move. For example, there will be 100 million automobiles, 60 million motorbikes or bicycles and 20 million dogs and cats. Portable device units include 50 million video cameras and digital cameras, 50 million portable PCs and 30 million parcels. In addition, there will be 90 million TV set boxes, 40 million refrigerators and 10 million vending machines, which could be used as a device or remote monitoring and remote control service. The total is 570 million, about five times as much as the human population. So we have a lot of demand for the future.

In 2000, we made a forecast that mobile multimedia traffic will account for 50 percent of the total services in 2005 and 70 to 80 percent in 2010. At the end of March 2002, the percentage of mobile multimedia traffic in our network was about 20 percent. I estimate 50 percent will be accomplished in 2005.

The basic principles of our global strategies include deploying the 3G and multimedia services in overseas markets. For this purpose we have built partnerships with parties who have agreed to disseminate the wideband CDMA network as early as possible and create a common global mobile multimedia platform. At the same time, we intend to strengthen our competitiveness through content sharing and joint equipment procurement. The past investments were made based on these principles and not merely in expectation of capital gains. However, we regret that the enterprise values of our partners have diminished recently. The rights we acquired remain unchanged, and we are committed to continue implementing our strategies.

### The Impact of i-mode

I-mode has been a great success for us. We acquired more than 30 million subscribers to i-mode in three years. Today more than 80 percent of our total customers have signed up for i-mode and the number of i-mode users is still growing at the pace of 10,000 to 20,000 a day. The number of information sites accessible from i-mode has also increased in line with our subscriber count. As of September this year, there were more than 59,000 general sites.

We created a positive growth cycle in this business. When the content offering becomes richer, more subscribers are attracted to the service and the increase in subscribers encourages content providers to develop more sites.

I-mode has had a tremendous impact on our overall business in four ways. First, it helped us to increase our average revenue per user (ARPU). Second, we have a lower churn rate. Third, we have had an increase in acquiring customers. Fourth, we have generated new sources of revenues such as commission income from bill collection services on behalf of content providers.

Our voice ARPU has been declining over the last few years. However, we were able to offset the decline by the revenue from i-mode service. Today, the data ARPU from i-mode service accounts for about 20 percent of our aggregate ARPU. To further increase i-mode ARPU we have developed advanced handsets with color displays and Java capabilities. We also raised the transmission speed of the network from 9.6 kbps to 28.8 kbps. Content providers have also contributed to and benefited from the success of i-mode.

We have certainly reduced our churn rate over the last few years. This trend gained further momentum after the introduction of i-mode. Although it is difficult to quantify the correlation between i-mode and the reduced churn rate, we believe these two are somewhat inter-related.

I-mode is also very effective for new customer acquisition. Our market share has risen after the introduction of i-mode from 57.4 percent at the end of March 2000 to 59 percent in March 2001, up 1.7 percent in one year. I-mode service has enabled us to diversify revenue sources. In addition to the traffic revenues, we were able



LEFT TO RIGHT:  
Hugh Patrick  
Eli Noam  
Keiji Tachikawa  
David Weinstein

*We intend to strengthen our competitiveness through content sharing and joint equipment procurement.*

to receive portal usage fees from the content providers. In August 2000, we started an advertisement business on i-mode and we collect ad placement fees. We also receive commission income from our bill collection service. At the end of March 2002, the total amount of premium content distributed on the i-mode service was about 700 million U.S. dollars. We received 9 percent of this amount as a commission fee for collecting such premium information on behalf of the content provider.

In addition, we have started supporting e-commerce transactions on our network. We believe e-commerce has huge potential for growth in the future and we expect to receive more revenues from e-commerce transaction going forward.

### The Importance of 3rd Generation Technology

In Japan, we introduce a new generation of mobile systems roughly every ten years. By introducing the advanced technology, we upgraded the quality of our network and enhanced the features of our service. Last year, to respond to the growing demand for data communications, we launched our third generation system which offers higher transmission speed and better quality than the second-generation network. One of the most distinctive capabilities of the 3G network is its transmission speed. It can support speeds up to 384 kbps, about 40 times faster than the second-generation systems. In addition, 3G is a globally standardized system. Users will be

able to use their own handset in other countries where the same technology is implemented. Our 3G network is based on the wide-band CDMA technology.

NTT DoCoMo's 3G service is branded FOMA (Freedom of Mobile Multimedia Access). Since the launch of the service, we have been making efforts to expand its coverage, improve the service quality and add new features. In order to improve the convenience of the users, we recently started the "Dual Network" service, which enables customers to use both the 2G and 3G phones with the same telephone number. We also started a video clipping service called i-motion which allows customers to see a short media on i-mode. In the near future we are planning to start a visual mail service, which will enable users to attach video messages to the e-mails.

In the next fiscal year we are planning to start a global roaming service, mobile EC and location based services on our 3G FOMA network. We also offer different types of handsets for our 3G services. The Standard-type phone has i-mode capability. The Visual-type has a built in camera for the video phone service. The PDA-type has all the advanced features of a PDA and video communications capability. It has a small handset, which is connected with the main unit using Bluetooth technology. We also have a data only card, which supports transmission speeds up to 384 kbps. In addition to these devices, we hope to release more handsets as soon as they become ready in order to continue the upgrade of service offerings.

One of the most distinctive features of the third generation system is the video capability. Users can talk to the other end while seeing their face. It is also possible to download short video and music clips on the handset. In November last year we launched our video clipping service called i-motion. In this service, users can download a fifteen second video clip to the handset.

We believe that the advanced capability of 3G service will become very important in the future, especially for corporate customers. We can provide unique corporate solutions by taking advantage of the faster data communications capability of the 3G network.

Mobile communication services will serve society in the future. In the 21st Century, society is expected to change gradually in the following areas. We will see an aging society as the birth rate declines, and the trend of personalization is expected to gain further momentum. Corporate activities will increasingly globalize and businesses will seek more added value. When we consider our future from a global perspective, environment conservation is an issue that we all have to tackle.

We believe mobile communications can play various roles to respond to these affected changes.

In response to an aging society and lower birth rate, if the elderly or children carry a mobile device, mobile services can contribute to enhancing their safety using voice communications and also by sending real-time information on their location. Mobile services also meet the demand for person-

alization because people can demonstrate individuality after obtaining information catered to their preferences through a mobile terminal. In response to the globalization trend, we will enable users to use the same terminal at home and overseas. Additionally, through the invention of automatic translation functions, communication will be carried out much more smoothly, which will further improve the convenience offered to users. Mobile services will also be an effective tool for providing added value. As corporations increase their mobile related investments, information, knowledge and other values will accumulate in society, accelerating the trend towards a knowledge-based society.

In terms of ecology, Intelligent Transport Systems (ITS), e-commerce and other forms of mobile services can contribute to improving efficiency in production, transportation and distribution, thereby reducing the burdens on the environment. As household appliances are connected through networks and paper is replaced by electronic media, mobile communications can play a role to reduce energy and resource consumption.

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#### Question and Answer

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**Question:** How would you analyze the differences in the regulatory environment which has been involved in and has its influence on the development of NTT DoCoMo versus communication companies in the United States? What recommendations would you give to the FCC to change the policy in the United States?

*We created a business model that took into account the convenience offered to both users and content providers.*

**Dr. Tachikawa:** The mobile communications industry is generally a deregulated market in any given market in the world, but I think Japan in particular is the most advanced market in terms of being deregulated. In Japan, if an operator wants to change the entire system you only have to notify the ministry to that effect. In the United States, I'm not really sure, but if an operator wants to change the entire system it may require approval from the public utility office. There is a great difference in the ways Spectrum is allocated. In Japan, we use the duty contest scheme. In the United States, Spectrum is allocated through auction. It doesn't mean that we are able to use this spectrum free of charge. Actually, we have to pay for the spectrum later. In the United States you have to pay for the spectrum up front upon the completion of the auction. In the case of Japan, while these carriers are paying 540 Yen for one subscriber in the form of a spectrum utilization charge, DoCoMo alone is paying 20 billion Yen on an annual basis to the Government for using the spectrum.

**Question:** Why did NTT DoCoMo succeed where other mobile operators failed? Was it due to the different technology, a different business model or a different customer base?

**Dr. Tachikawa:** Part of the reason why DoCoMo was successful in the wireless internet business is because we created a business model that took into account the convenience offered to both users and content providers. The biggest

difference between i-mode and WOC is that with i-mode we utilize a protocol which is compatible with the land line internet. On the other hand, WOC utilizes a unique protocol tuned for the wireless environment, but this was quite burdensome on the part of the content providers. Another big difference between i-mode and WOC is that with i-mode we utilize a packet network in which the access time to the network is quite short. We provided an "always environment" to the users and we bill the customers by the amount of information transmitted or received by the customers as opposed to the collection time. Recently the WOC has made some improvements in these areas. The lesson here is that multimedia services like i-mode have to be created jointly with the involvement of content providers and users, which is a major difference between voice communications.

**Question:** What is your forecast for Europe and the U.S. in ten years from now? Do you foresee that they will follow the path of your successful company?

**Dr. Tachikawa:** There will be a limitation in the growth of voice communications business going forward, especially when it comes to the advanced nations. I think the driving force for growth in the future will be non-voice traffic. Our plan is to increase the traffic from non-voice service to account for fifty percent of the total by 2005.

I am really concerned about Europe. Unless European operators are able to provide mobile multi-



media services sooner rather than later, they won't be able to find a source of growth in the future.

**Question:** Given the difference in technologies between the U.S. and Japan in the wireless area and given that the U.S. wireless companies have been very slow to adopt new technologies, can you speak about the strategic rationale behind Cingular and AT&T wireless?

**Dr. Tachikawa:** Please understand that the United States was the frontrunner in the development of mobile communications technology previously up to the first generation of mobile communications systems. Unfortunately, the United States lagged behind Japan by four years in the introduction of the first generation radio systems due to regulation issues. That is why the United States was three years behind Japan and Europe in the introduction of the second-generation mobile communication systems like IS95. What made things worse was that they did not really terminate the first generation analog systems at an early date. About fifty percent of the users or the operators are still operating the analog systems today. But in Japan, by the end of 1999, all of the analog systems were completely terminated.

So now we are standing at the beginning of the third-generation (3G) technology, while in the United States there are some CDMA-1X systems being introduced. Wideband CDMA (W-CDMA) systems have not been introduced in the U.S. market yet; W-CDMA is a technology that could be introduced at

the next generation of GSM systems, namely, Cingular, AT&T wireless and Voicestream.

**Question:** Are you worried that there won't be a uniform compatible global 3G standard?

**Dr. Tachikawa:** In the 1990s there was a general agreement to try to come up with a single global unified standard for the 3G systems, and ITU (International Telecommunication Union) was the place to develop a global 3G standard. However, after all these efforts in 1999, it was agreed that ITU would admit five different technologies as a 3G standard. Despite all these efforts five different standards were created for 3G. So what the operator has to do is to make a choice out of these five different technologies and try to disseminate that technology to the widest possible number of users.

Out of these five different technologies the two mainstream technologies are CDMA-1, 1X and the wideband CDMA (W-CDMA) technology, which is known as UMTS in Europe. So these two are in a sort of a competitive relationship. The 3G standardization effort provided us with a question upon which we can reflect in the process of developing a fourth-generation (4G) system: Would it be wise for us to pursue a unified 4G standard for the world? Should we just abandon the standardization idea from the beginning, let all the different technologies compete against one another, and let the market decide?

As an engineer I am not really sure which is the best solution because if you agree on a single

standard for the entire world, people tend to become conservative and that could delay the development of the next technology that will follow in the future. My personal view is to try to avoid any standardization in the future but develop a technology that could be compatible with many different technologies. Software defined radio is one example of that.

**Question:** Moving ahead globally, what road map do you see for your joint venture in the United States with AT&T Wireless and, second, how does NTT DoCoMo as a company look to tackle CDMA technology in Asia with them investing in China, Korea, and parts of India?

**Dr. Tachikawa:** Prior to AT&T Wireless we first identified our partner for Europe because European countries have agreed on a single standard, which is UMTS (which is equal to wideband CDMA technology). Since we had the common technology with European partners from the beginning, we were able to pick up any operator in terms of the technology. We chose KPM Mobile, which operates not only in the Netherlands but also in Germany through its subsidiary. Since all of the operators in Europe used the same technology for 3G, we can use a partnership with a single operator as a trigger to expand out business because compatibility is already given in that environment. From the beginning we didn't have any intention to form an alliance with every single country in Europe. Then we decided what to do with the United States in the year 2000

because that was when the future direction in the U.S. market became clearer. Based on what I explained earlier we decided to pick AT&T Wireless as our partner.

When it comes to Asia, there is a possibility that both wideband CDMA and CDMA 2000 will be implemented in these markets. So unless we know which operator is going to use which technology, it is impossible for us to select a partner for the Asian countries. So far only Korea, Singapore, Hong Kong and Taiwan have decided which operators are going to use which technology. We are able, if we want to, to select a partner for these markets, but in the bigger markets like China, India, Indonesia, nothing is decided yet. So we have to wait.

**Question:** Sitting as the head of an extremely successful company, what do you see as the causes for your success and the causes for the failure of so many companies around you?

**Dr. Tachikawa:** The biggest reason for our success is that we were able to identify the right market because we believed the 1990s was the age of personalization. Therefore, cellular phones were quite ripe for that age because people wanted to have their own individual means for communications. This lesson can be applied to other industries. If they are able to develop and sell market products that suit the needs of customers they will be able to increase their sales and make a big hit. Actually, I am personally receiving a lot of criticisms from other industries, claiming that cellular phones have



SYMPOSIUM IN SESSION

affected their sales. I am receiving complaints from those in the cartoon industry, the CD market, the sweets industry like cakes and candies. They claim that they are unable to sell their products as well as before just because of the emergence of cellular phones, but I think that is wrong. They were just not able to provide products that are accepted by the markets. I think the lesson here is that the needs in society change over time and companies that are unable to grasp this change in the trend and respond will drop out from the race eventually. There are many companies which belong to the old economy in Japan. Unless they are able to reform themselves, I think they will have to shrink.

*The needs in society change over time and companies that are unable to grasp this change in the trend and respond will drop out from the race eventually.*

## 財界著名人講演シリーズ

### NTTドコモとグローバル・コミュニケーション・カルチャー

(株)NTTドコモ代表取締役社長  
立川敬二

2002年11月12日、コロンビア大学ビジネススクールの日本経済経営研究所及びテレインフォメーション研究所は、同スクールの学生団体である日本ビジネス協会との共催で、NTTドコモ代表取締役社長の立川敬二氏の講演会を開催しました。テレインフォメーション研究所所長ノーム教授の紹介に続き、立川氏がドコモの戦略とモバイルマルチメディアについて講演を行い、当研究所の研究副所長ワインスタイン教授が質疑応答のモデレーターを務めました。以下は講演の抄訳です。

#### 携帯電話産業の成長とドコモの戦略

1995年から2001年の6年間に世界の携帯電話加入者数は10倍に膨れ上がった。同6年間でヨーロッパと日本において加入者が14倍の増加となったのに対し、北米では3.8倍の増加に止まった(図1参照)。現在、日本の携帯電話加入者は7480万人に上り、中国、米国に続き世界第三位だが、その浸透率では54.4%と米国の46%より高いものの(図2参照)、ヨーロッパの普及率の高い国(伊、フィンランド、英、独、仏)とシンガポール、韓国に劣っている。このことは、日米両国においてまだ携帯電話市場拡大の余地があることを示唆している。また日本においては、固定回線電話よりも携帯電話の方が加入者数が多く、インターネット接続にも携帯電話の方が多く利用されている。このように、携帯電話は現在日本において第一のコミュニケーション手段になっており、21世紀のドコモのモバイル戦略は「音声から非音声サービスへ(マルチメディア)」「モバイルなあらゆるものへ(何処でも)」「国内から国際へ(グローバル)」の3点に集約することができる。移動体通信の基本性能を上げることで応用カテゴリーを広げ、市場を拡大して行くことが基本戦略である。

#### 何処でもマルチメディア：ドコモのモバイルマルチメディア戦略

モバイルマルチメディアのサービスには、「人から人」「人からマシーン」「マシーンからマシーン」の3形態があり、インターネット(Eメール、ブラウジング、iモード)、ポジショニング(カーナビ、パーソナル・ナビゲーション)、メディア配信(音楽、広告、ゲーム、映画予告編)、遠隔探知・制御(自動販売機のPOS(販売時点での在庫・発注管理)、環境監視、電気製品)、決済(モバイル電子商取引)の5分野に大別される。人間だけでなく、自動車、自転車、ペットなど動くもの全て、ビデオカメラ、デジタルカメラ、コンピュータ、小包など持ち運ぶもの全て、テレビや冷蔵庫などの家電や自動販売機など遠隔探知・制御のニーズのあるもの全てにモバイルサービスの潜在的需要があるという考えに基づき、2010年までに日本市場において人口の約5倍の5億7千万の需要を見込んでいる。

#### 世界へ：ドコモのグローバル戦略

第3世代携帯電話の技術企画標準化ではドコモの技術を取り入れた広帯域(Wideband)CDMA方式を採用し、W-CDMA企画のグローバルネットワークを築く戦略を展開している。例えば米国においてはW-CDMA方式を採用するAT&T Wireless社とビジネス、技術面での協力・提携を行い、日本で大成功したインターネット接続サービス「iモード」の米国版を通じたモバイルマルチメディアの更なる普及を目指している。

#### 「iモード」の爆発的ヒットと次世代モバイルコミュニケーション

日本においては、10年に1度のペースで移動体通信の世代交代がなされてきた。第1世代のアナログ携帯電話は1999年までには廃止され、第2世代のデジタル携帯電話に完全に取って代わられた。「iモード」加入者はサービス開始から3年間で3000万人を超え、現在も1日1万から2万のペースで増えつづけている。「iモード」は加入者一人当たりの平均売上の上昇、顧客定着、顧客獲得に貢献し、広告掲載料、コンテンツ提供者に代わっての購読料の徴収サービスなど新たな財源も生み出した。「iモード」の爆発的ヒットに平行してより高速・高品質のデータ通信を望む声に応え、NTTドコモは2001年に第3世代(3G)の携帯電話サービスFOMA(Freedom Of Mobile Multimedia Access)を開始した。W-CDMAを採用した第3世代の携帯電話サービスは別名「IMT-2000」とも呼ばれ、第2世代の40倍の速度を実現し「iモーション」と呼ばれる画像を中心とした広帯域サービスを提供している。FOMAの端末のカテゴリーとして音声中心の標準タイプ、テレビ電話タイプ、パソコンに特化したデータカードタイプ、PDAタイプが挙げられる。次世代モバイルコミュニケーションは、高齢化、個性化といった社会の変化やビジネスのグローバル化、環境保護の動きに対応し、安全性、個性、利便性、エネルギー節減を追求し、より豊かな知識ベースの社会を目指して行くものである。

#### EDITED BY

Joshua Safier  
Associate Director  
Center on  
Japanese Economy and Business

#### ASSOCIATE EDITOR

Yoko Mochizuki  
Program Officer  
Center on  
Japanese Economy and Business

#### PHOTOGRAPHY

Joe Piniero

#### DESIGN/PRODUCTION

Melanie Conty

#### CENTER ON JAPANESE ECONOMY AND BUSINESS

Columbia Business School  
321 Uris Hall  
Mail Code 9155  
3022 Broadway  
New York, NY 10027  
Phone: (212) 854-3976  
Fax: (212) 678-6958  
Email: cjob@columbia.edu  
<http://www.gsb.columbia.edu/japan>