



# A Study on the Tele-communication Traffic Trends and the Impacts of Teleworking under Covid-19 State of Emergency

## Summary

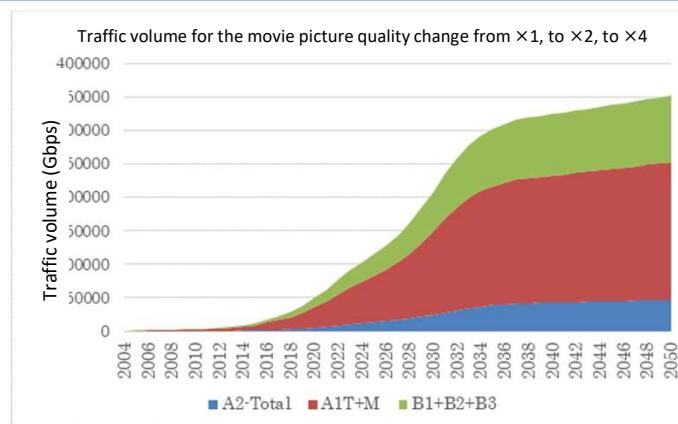
The role of ICT towards the building of a zero-carbon emission society is becoming important, but its progress will lead to a rapid increase in power consumption. However, data analysis from the standpoint of consumption regarding what kind of demand has brought about today's increase in the information traffic volume is limited. Therefore, in this proposal, existing statistical data regarding the increase in the tele-communication traffic demand were analyzed and examined. As a result, it was found that (1) the increase in the video streaming demand and the decrease in communications cost are significant factors for the increase in the tele-communication traffic volume; (2) productivity improvement due to the introduction of ICT is conspicuous in large enterprises; (3) although the tele-communication traffic volume has increased owing to teleworking more widely spreading under the declaration of a COVID-19 state of emergency, CO<sub>2</sub> emissions have fallen owing to a decrease in commuting by car.

## Proposals for Policy Development

- Under the declaration of a COVID-19 state of emergency, differences have widened between job fields (enterprises, schools, etc.) where productivity has improved owing to the expanded introduction of ICT and job fields where productivity is not yet improved. To offer an incentive for introducing ICT to the job fields where ICT has not spread and to create a system consistent from resource procurement and the production site through sales management, as shown in Industry4.0, is an important government policy issue.
- The information traffic volume was largely increased following the introduction of teleworking through the utilization of ICT encouraged by the declaration of a COVID-19 state of emergency in 2020. It is expected that the change in ways of working involving a decrease in commuting hours may contribute to reductions in CO<sub>2</sub> emissions, helping the building of a "bright and affluent low-carbon society". Such social change due to the introduction of ICT may likely continue to the future, and development of information network infrastructure and measures responding to the increase in power demand associated with the development are required.

### 1. Information traffic analysis and prediction

The published data [1] was employed to estimate the growth rate of the information traffic volume; it was found that the yearly growth rate during 2004 through 2018 was 30.1%, and it increased rapidly especially during 2013 through 2018. Specific major factors were the increase in video streaming services and the decrease in communications cost. The information traffic demand was analyzed to estimate the traffic demand in the future. (Fig. 1). It was estimated that the demand may increase sharply toward 2030, but then saturate because of population decline toward 2050.



A1T+M: Fixed-line traffic of 5 ISP companies plus mobile communications traffic  
 A2: Traffic by subscribers of other dedicated lines  
 B1: Traffic exchanged at major IX in Japan  
 B2: Traffic exchanged in Japan  
 B3: Traffic exchanged overseas

Fig. 1 Estimation of tele-communication traffic volume in the future for the movie picture quality change from  $\times 1$ , to  $\times 2$ , to  $\times 4$

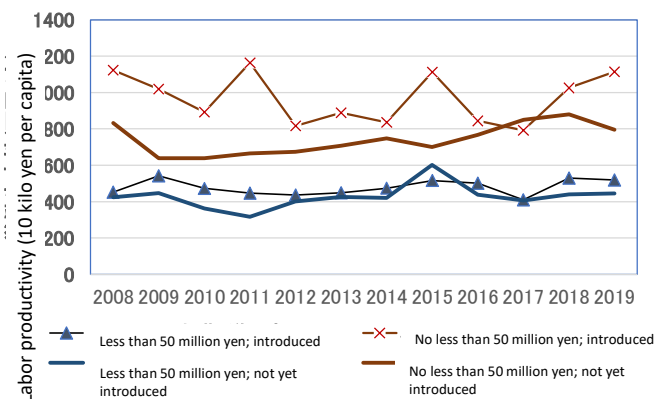


Fig. 2 Change over time in productivity owing to introduction of IoT by capital scale

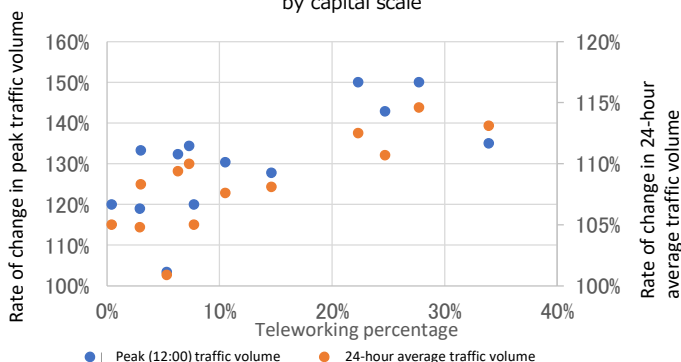


Fig. 3 Relationship between teleworking percentage and rate of increase in traffic volume

### 2. Impact of ICT on productivity

A questionnaire survey conducted by the Ministry of Internal Affairs and Communications [2] was used to summarize the adoption of the use of ICT and the impact on productivity. Fig. 2, "Change over time in productivity owing to introduction of IoT by capital scale," shows that productivity was improved owing to the introduction of IoT over the entire period. The estimated results can be interpreted to show that improvement of productivity by 20% to 30% may be possible for large enterprises with capital of no less than 50 million yen.

### 3. The impact of teleworking under a COVID-19 state of emergency

Under the COVID-19 crisis, teleworking has been attracting rapidly high attention, and many enterprises in urban areas adopted it. Analyzing one of the fact-finding surveys [3] and NTT's data of the change in traffic [4] found that a 10% increase in teleworking resulted in a 2.8% increase of the 24-hour average traffic volume and an 8.2% increase in the peak traffic volume (Fig. 3). On the other hand, it was also confirmed that teleworking reduced commuting by car, in turn reduced gasoline consumption and CO<sub>2</sub> emissions.

[1] Ministry of Internal Affairs and Communications, "Estimates for Internet Traffic in Japan", [https://www.soumu.go.jp/joho\\_tsusin/eidsystem/market01\\_05\\_03.html](https://www.soumu.go.jp/joho_tsusin/eidsystem/market01_05_03.html) (Day of access: Nov. 26, 2020)

[2] Ministry of Internal Affairs and Communications, "Communications Usage Trend Survey (Companies)", <https://www.soumu.go.jp/johotsusintokei/statistics/statistics05a.html> (Day of access: Jul. 27, 2020)

[3] Persol Research and Consulting Co., Ltd., "Emergency survey regarding the impact of measures against novel coronavirus infection on teleworking", Two times, <https://rc.persol-group.co.jp/news/202004170001.html> (Day of access: Jun. 19, 2020)

[4] NTT East, "Concerning network traffic (back number)" [https://www.ntt-east.co.jp/aboutus/traffic/20200414/#area\\_traffic](https://www.ntt-east.co.jp/aboutus/traffic/20200414/#area_traffic) (Day of access: Jul. 8, 2020)