

centre. As Sendai wholesalers grow more confident in the international marketplace, manufacturers who hope to increase penetration in Japan's rural areas would do well to concentrate on this important distribution hub.

While Sendai residents are reputed to be more traditional than people living in Tokyo and Osaka, they see themselves as being more urban and sophisticated than their rural neighbours. Therefore, retail distribution systems in the city are fairly well developed. Major national supermarket and department chain stores have a strong presence in Sendai, as does the convenience store sector.

Total sales for the region, excluding Miyagi, reached ¥6.4 trillion in 1988, with one retail outlet for every 15 to 17 people. In Miyagi, there was one retail outlet for every 15 residents in 1988, and total sales were valued at ¥2 trillion. The same year, Miyagi's 9 309 wholesalers rang up sales of ¥9.4 trillion, far surpassing any other prefecture in the region.

In 1988, there were 30 705 wholesalers in Tohoku, while major retailers included 44 department stores and 100 self-service establishments. Department and self-service store sales were almost equal, and together they accounted for 14 per cent of Tohoku's retail sales.

Tohoku's retail outlets benefit from the region's lower wage rates and more readily available workforce. In rural Aomori, retail wage rates were only 75 per cent of the national average in 1988, and even in urbanized Miyagi, they were only 93 per cent of the national average.

Rural retail patterns differ significantly from national averages, however. For example, although Tohoku accounts for 7.3 per cent of Japan's retail sales, the region contributes only 4.7 per cent to the country's large-store sales. Owner-operated affiliates of supermarket chains and co-operatives are also popular in rural areas.

Consumption patterns reflect the region's rural nature. Household appliances, for example, comprise only 5.3 per cent of the average Tohoku shopping basket, versus 8.9 per cent nationally. And the fact that food products make up only 25.1 per cent of the average consumer's budget (versus 31.1 per cent nationally), probably reflects a relatively traditional diet based on home-grown produce.

Only 77 per cent of all homes had refrigerators in 1984, 28 per cent owned VCRs and just under 50 per cent had microwave ovens. While penetration rates have since increased, Tohoku remains one of the slower areas in Japan to adopt new trends.

Science and Technology

Home to the nationally renowned Tohoku University, Sendai has sufficient urban sophistication to attract top researchers. The university's active industrial research department works effectively with industry on biotechnology and communications research, and has won worldwide acclaim for achievements in semiconductor and new material — especially metal alloy — research.

Other areas of the region have also succeeded in wooing scientific research establishments that require large tracts of land or isolation for their facilities. Both Aomori and Miyagi, for example, are the site of biotechnology and R & D complexes.

The Aomori Technology Center was founded in 1988 to encourage adoption of advanced technology by local industry. Activities are concentrated in the areas of biotechnology, mechanics and electronics. Elsewhere in Tohoku, smaller research centres are focussing their efforts on technology used in more traditional processes that produce pottery and lacquerware, food products, plastics, textiles, and forest products.

Agricultural research stations form the nucleus of Tohoku's active biotechnology and R & D activities. The main objective of agricultural research is to improve productivity and, thereby, improve the industry's efficiency and competitiveness.

Private companies and co-operatives are also active in agricultural and biotechnology research. For example, Snow Brand Milk Products Ltd., Japan's leading manufacturer of dairy products (based in Tokyo but active in Tohoku), is pursuing research activities in biochemicals, agricultural biotechnology, bovine embryo transfer, and high-yield seed production.

Canada and Japan have co-operated on some agricultural research projects, but the flow of technology has mainly been one way — with Canada providing the know-how.

A co-ordinated effort supported by all seven prefectures, the Tohoku Intelligent Cosmos Plan promotes the region as a site for R & D facilities and related industries. Intelligent Cosmos Research K.K. has supported the establishment of the following companies:

- Low Power Communication Systems Research Laboratories
- Amorphous Magnetic Device Laboratory
- Rice Breeding Laboratory
- Sun Noch K.K. High Grade Cold Water Fish Culture Laboratory