

Innovation and Knowledge Creation

Truly innovative companies have high levels of competence in managing the 'spiral of interaction' between tacit and explicit knowledge through the four processes.

Socialisation (Tacit to Tacit)

Honda Honda set up 'brainstorming camps' to solve problems in development projects. The meetings were usually away from the workplace and were open to every employee who was interested in the project; status and credentials were never challenged. Such camps were not just a forum for creative dialogue but also a medium for sharing experiences and enhancing mutual trust among participants. The camps reoriented the 'mental models' of all individuals but not in a forceful way.

Externalisation (Tacit to Explicit)

Canon The case of Canon's mini-copier is a good example of how an analogy was used effectively for product development. The major barrier to lowering costs was the internal drum. In the end a disposable drum was used. The origin of this idea came from Hiroshi Tanaka (team leader of the taskforce) who explored how the technology for manufacturing beer cans could be used for a copier drum.

Combination (Explicit to Explicit)

Kraft Kraft was a manufacturer of ^{TELE-BASED} dairy and processed foods and utilised EPOS (electronic point of sale) data from retailers to create new sales systems and methods. Kraft developed an information-intensive marketing programme called 'micro-merchandising' which provided supermarkets with timely and detailed recommendations on the optimal merchandise mix supported by sales promotions based on the analyses of their EPOS data. Their analyses of data produced a unique classification of stores and shoppers and were capable of pinpointing who shopped where and how.

Internalisation (Explicit to Tacit)

General Electric Documents, manuals and oral stories help people internalise what they have experienced and also to transmit it to others. GE documented all customer enquiries and complaints (more than 14,000 per day) and then 'programmed' them into 1.5 million potential problems and their solutions. The system is equipped with an on-line diagnosis function which uses artificial intelligence technology to provide telephone operators with quick answers to enquiries. If solutions are not found, 12 full-time specialist repair experts produce solutions on the spot and these are then programmed into the database. Crucially, new product development staff regularly spend time with the telephone operators and 12 specialists to 're-experience' the customer problem-solution knowledge.

The Spiral of Knowledge Creation

New product development often occurs from a spiral through the four modes above. *Socialisation* processes (perhaps like the brainstorming camps in Honda) help define the broad 'field' or boundaries within which the product will sit. *Externalisation* will take this rich mix of tacit knowledge and convert it to a 'product concept'. This product concept is 'tested' and 'justified' against other bodies of explicit knowledge in the organisation such as market analysis, profit targets, production capability, i.e. the process of *combination*. Out of this comes the product prototype. The organisation's commercialisation of the new product now crucially depends on *internalisation* of this knowledge, perhaps through piloting.