Ergonomics standards: identifying stakeholders and encouraging participation


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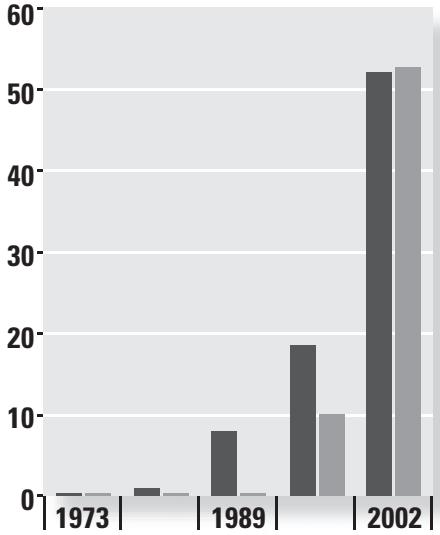
It sometimes looks as though potential users of ergonomics standards, or organizations that represent their interests such as employer organizations or trade unions, are quite simply not involved in the development of standards in the field of ergonomics. This is a surprising observation since it violates one basic ergonomics requirement: involve users in the design of systems. The authors look at how far this assertion is true, and what can be done to improve the situation.

In 1973, the International Ergonomics Association (IEA), which currently represents some 19 000 ergonomics scientists and practitioners worldwide, proposed to ISO to start standardization in the field of ergonomics. In 1974, ISO established ISO/TC 159, *Ergonomics,* to set this process in motion, and published its first ergonomics standard in 1981 as ISO 6385:1981, *Ergonomics principles in the design of work systems.*

Over the following years, the number of standards increased rapidly (**Fig. 1**).

Fig. 1 – ***Number of ergonomics standards from ISO and CEN***



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Up to today, more that 150 ergonomics standards have been published by ISO and by CEN (European Committee for Standardization) on a variety of topics[4]. The best-covered subjects are machine safety, workplace and equipment design, and visual information and computer operation (**Table 1**).

It was ergonomics scientists and professionals that developed most of these standards. The considerable quantity of ergonomics standards available has helped to develop and emancipate the discipline over the last 30 years.

Users of ergonomics standards

However : the question justifiably arises of who, precisely, are the *users* of ergonomics standards ?

The IEA (International Ergonomics Association) defines ergonomics (or human factors) as " the scientific discipline concerned with understanding of the interaction among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance ".

Thus, if we go by this definition, ergonomics deals with human-centred design of products and processes in order to *optimize human well-being AND system performance.*

Ergonomics has therefore both a **social goal**, which is important for the users of products and processes (including work products and work processes which are important for the workers), and an **economic goal**, which is important for the management of an organization. This means that parties interested in the social aspects of products and production processes (such as workers), and those interested in the economic aspects (such as managers), have a clear interest in ergonomics standards. Both groups can be considered potential users.

The economic aspects of ergonomics are often underestimated. In management, a business process is usually described as a chain of value-adding activities (**Fig.2**).

Table 1 – *Topics covered by ergonomics standards from ISO and CEN*

Protective devices	**6**
Ergonomic design principles	**8**
Machine safety	**26**
Physical work load	**7**
Mental work load	**9**
Workplace/equipment design	**25**
Visual information/computers	**49**
Other information/operation	**6**

Product creation and product realization

For example, the processes of **product creation** and **product realization** can be characterized by the chain : research, product development, process development, purchasing, production, and distribution. Product ergonomics can add value to the process of product creation (research, product development) and production ergonomics to the process of product realization (process development, purchasing, production, and distribution).

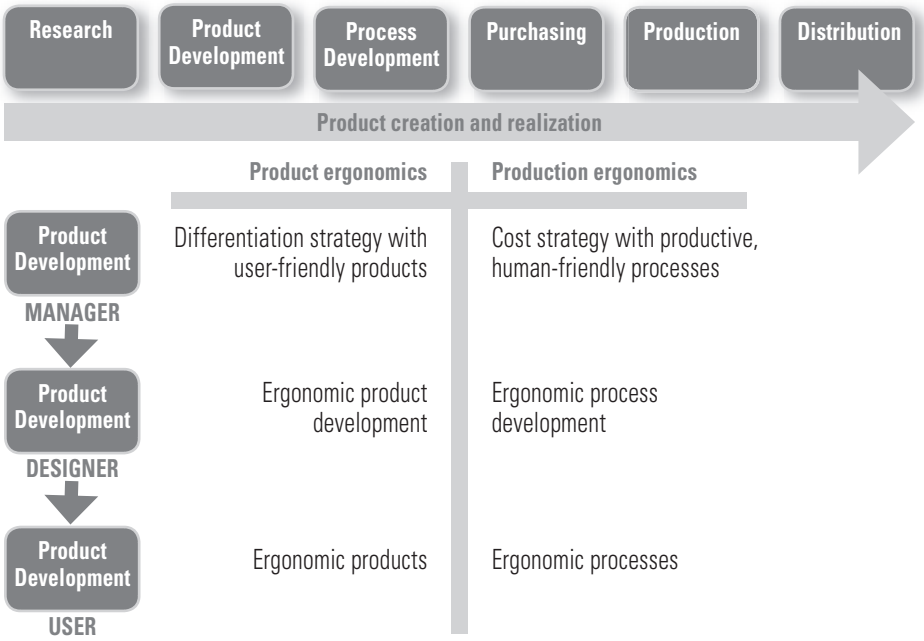
In **product creation**, the management (the marketing manager, for example) can decide to implement an ergonomic strategy, which implies that a competitive advantage can be reached by developing user-friendly products.

In **product realization**, the management (the production manager, for example) can decide to go for an ergonomic strategy as well. This implies that with a human-friendly production system, the labour force is more productive and has acceptable working conditions.

Both ergonomic strategies can be implemented by using an ergonomics innovation process in which product and process designers and ergonomists are involved. This should lead to ergonomic products and production processes for users such as consumers and workers.

[4] Dul 2003. " Man is the Measure of all Things ". On human-centred design of products and processes. Inaugural Address. Rotterdam : Erasmus Research Institute of Management.

Fig. 2 – *Ergonomics in product creation and realization (adapted from Dul 2003).*



Different parties with an interest in ergonomics

This view on the position of ergonomics in an organization illustrates the fact that there are many different parties that may have an interest in ergonomics: managers, designers, ergonomists and users. Consequently, these parties will also have an interest in ergonomics standards for human-centred design of products and processes.

This list of interested parties corresponds closely to the list of users mentioned in the revision of the first ergonomics standard on ergonomic principles in the design of work systems: managers, project managers, workers (and their representatives), professionals (such as ergonomists), and designers.

However, it can sometimes look as though these potential users of ergonomics standards, or organizations that represent their interests such as employer organizations or trade unions, simply do not take part in the development of ergonomics standards: indeed, the fact is that ergonomics experts have developed most of the 150 ISO and CEN ergonomics standards. Other users – or organizations representing them – have hardly been involved. And this is indeed odd when it runs in total contradiction with one of the base tenets of ergonomics: involve users in the design of systems.

[5] Mitchell et al. (1997) ; This model was recently applied by Willemse et al. (2003a) to identify stakeholders for standardization, and by Willemse et al. (2003b) to identify stakeholders specifically for ergonomics standards.

Identifying and classifying the stakeholders

To improve this situation, we would like to present a model that characterizes important users or organizations representing them (from now on we refer to these as "stakeholders") that ought to be involved in the development of ergonomics standards.

This model is based upon a stakeholder model [5] Mitchell et al. (1997) that was originally developed for identifying important stakeholders in a business environment from a manager's point of view. It uses three basic variables :

- Power **(P)**, which is the possibility for a stakeholder to influence the outcome, based on, for example, financial means or knowledge;
- Legitimacy **(L)**, which is the desire of other stakeholders that a specific stakeholder is involved;
- Urgency **(U)**, which indicates that the outcome is important for the stakeholder.

Based on these three variables, seven groups of stakeholders can be distinguished.

The first four groups have urgency: they are important users of the standard.

The **Definitive stakeholder** (PLU) has power, legitimacy and urgency: He can influence the outcome, others consider his involvement to be important, and the outcome is important to this stakeholder. This stakeholder has to be involved in the standardization process. Examples of this stakeholder are ergonomics consultants and large employers.

The **Dependent stakeholder** (UL) also has legitimacy and urgency, but possesses less power to influence the outcome. Involvement of these stakeholders needs to be ensured. Examples of such stakeholders are the trade unions, employer organizations, representations of small companies, occupational health and safety services, and designers.

Involvement of **Dangerous stakeholders** (PU) is not desired by the other stakeholders, but they do have power and urgency to influence the outcome. For these stakeholders, some means of participation needs to be found that is acceptable to the other stakeholders, and which will convert them into definitive stakeholders. An example is a powerful organization that can trigger negative publicity if not properly involved.

The **Demanding Stakeholder** (U) has no power and legitimacy, but the standard is important to him. Stakeholders with power should represent this stakeholder.

The other three stakeholders are not users of the standard, but they can have an indirect relation to the standard.

The **Discretionary stakeholder** (L) is a stakeholder whose participation is desired by other stakeholders, such as, for example, research institutes who have particular knowledge of the topic of the standard.

Dominant stakeholders (PL) have power and legitimacy as for example, a dominant manufacturer, while **Dormant stakeholders** (P) have power but no legitimacy or urgency, such as, for example, consumer organizations.

In our view, at a minimum, the Definitive and Dependent stakeholders should always participate in the development of ergonomics standards, whereas the others should at least be informed about the development (**Table 2**).

It depends on the specific topic of the standard which specific parties belong to these stakeholder groups. For most ergonomics standards, ergonomics consultants, large employers, trade unions, employer organizations, representatives of small companies, Occupational Health and Safety services, and designers are predictably the most relevant stakeholders that should be involved in the process of development or revision of the standards.

Table 2 – *Stakeholder groups for ergonomics standardization* (P=Power, L=Legitimacy, U=Urgency).

Group	Involvement	*Examples*
'*Definitive Stakeholder*' (P,L,U)	Should participate	Ergonomics consultants, large employers
'*Dependent Stakeholder*' (L,U)	Should participate	Trade unions, Employer organizations, representation of small companies, Occupational Health and Safety Services (OHS), designers
'*Dangerous Stakeholder*' (P,U)	Should become 'Definitive Stakeholder'	Powerful organizations
'*Demanding Stakeholder*' (U)	Should be represented	Workers, small companies
'*Discretionary Stakeholder*' (L)	Could participate	Research institutes, branch organizations of OHS
'*Dominant Stakeholder*' (P,L)	Could participate	Dominant manufacturer
'*Dormant Stakeholder*' (P)	Should be informed	Consumer organizations

Encouraging user involvement in ergonomics standardization

Based on the above stakeholder model, we propose the following approach for user involvement in ergonomics standardization:

- Identify groups of stakeholders for specific ergonomics standards (not only ergonomists and worker representatives);
- Involve at least the Definitive and Dependent stakeholders in the development or revision of ergonomics standards;
- Manage the process towards consensus [6].

We expect the results of this approach to be rewarding. The standards will be better known to relevant stakeholders, will be accepted by more parties, and will be used more and be better implemented in practice.

Ultimately, this will make for better products and processes, both from the social and economic points of view.

Research needs

In order to achieve these goals, there is a need to get started on an evaluation study for a selection of existing ergonomics standards, and to find out who are the Definitive and Dependent stakeholders for them. Questions should be answered as to whether these stakeholders know of the standard, and if so, whether the standard serves its purpose. It is important furthermore to identify whether the relevant stakeholders were involved in the development of the standard.

Based on the results of such a study, recommendations can be made for user participation in future standards development and in revision activities.

Increasing the quality of the standards

Ergonomics has both social goals for workers and product users, and economic goals for managers.

Ergonomics standards therefore have a variety of users. Many ergonomics standards are available, mostly developed by ergonomics specialists. The attention should shift from increasing the quantity of standards towards increasing the quality of the standards, such that the standards are useful, desired and used by all relevant stakeholders.

In order to realize this, relevant stakeholders should be identified and should participate in the development or revision of a specific standard. □

[6] De Vries, H.J. (1999). *Standardization – A business Approach to the role of National Standardization Organizations*. Boston/ Dordrecht/London : Kluwer Academic Publishers.