

Cultural aspects in production management

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Abstract

Because enterprises are going to become more and more international decisions in production management have to be made also in an international context. Currently in most cases culture specific issues are neglected within the planning process as well as during operations management. The following article presents a framework that integrates cultural issues into production management. The framework is based on theories of culture, cognition and human decision processes as well as concepts of production management and includes empirical findings from different enterprises with international production sites. Within the framework cultural spheres of influence on production management are worked out. The underlying model should be able to explain different decision behavior in different cultural contexts. From the framework implications are derived for the culture specific design of production management in enterprises acting globally.

Keywords:

cultural differences, production management, decision making, behavior

1 INITIAL SITUATION AND RELEVANCE

The current situation of industrial enterprises is marked mainly by two trends: individualization and globalization. Especially globalization leads to new opportunities for obtaining resources and opening up new markets. At the same time enterprises are increasingly exposed to the (price and cost) competition at an international level. The availability of resources at low costs, especially at the labor market, leads to the transfer of production sites or the expansion of enterprises. In order to save distribution costs and to enhance the acceptance of products production goes to where the (potential) customers are located. The internationalization of the production is mainly driven forward by large enterprises. The automotive industry plays, like in other areas too, again the role of a forerunner. Also "...for small high-tech firms international orientation is regarded as crucial, since it is often ignored that sales potential in Europe domestic market is insufficient for the amortization of high product research and development costs...", [1]. According to a current study German companies ascribe positive effects on the employment at their home country to their activities abroad, [2].

Till now the question of location design within an international context is solved insufficiently. In addition the transfer of production isn't questioned at all, but dilapidates to a trend or adoption to the mainstream. The potentials of globalization are questioned by economists, [3]. Within the area of production management a holistic perspective considering all relevant factors like financial performance, logistics, law, quality etc. is missing.

Internationally oriented enterprises have several production sites at their disposal, which are distributed among different countries and which are embedded in a (also international configured) sourcing and manufacturing network. This globalization affects job sharing in and between enterprises, leads to reduced manufacturing depth and induces higher requirements on due date compliance and higher competition between different locations of the same company. The success of projects and of enterprises depends more and more on the coordination of capacities, resources and behavior. Since humans with their skills, experiences and values play a central role in this coordination processes, the cultural background and its value system is of special significance.

The success of internationalization depends on an adequate strategy that includes guidelines for the design of products, organization and business processes. These aspects can be subsumed in the term production management.

2 AVAILABLE CONCEPTS, LITERATURE REVIEW

When reviewing the available studies and concepts concerning culture and production management different positions can be determined:

A strategic point of view is concerned mainly with strategies for the international orientation of companies. Representatives are Mueller et al. [4], which develop a concept for the international orientation of automobile production sites, Heenan und Perlmutter [5] which describe management concepts for international enterprises as well as Goshal [6] and Meffert [7], which present basic types of internationalization.

The role of human decision making especially in operative production management is discussed for instance from Baines & Kay [8] which try to model the behavior of workers in manufacturing environments and Suer [9] which presents a visionary outlook for integrating human attitudes.

A further topic concerns the influences of culture and corporate culture on the success of production strategies, like TQM [10], TPM [11]; see also [12]. The best example within this field is presented by Rafferty und Tapsell [13], which examine the relationship between manufacturing strategy and self managed work teams from a cultural point of view.

The influence of culture on human thought and decision processes is picked out as a central theme by Strohschneider [14] which analyses cultural differences in decision making, Bu & McKeen [15] which examine work goals in different cultures, Johns et al. [16] which discuss cultural influences on the use of IT, Verburg et al. [17] which try to explain cultural differences in organization structure, values and labor regulations, Russell [18] which analyses differences in work culture and work related values as well as Allinson & Hayes [19] which discuss cross cultural variations in cognitive style.

When evaluating the available studies, concepts and findings it is without question that culture has an enormous impact on the success of internationally performing enterprises. At several decisions cultural differences play an important role. A framework for the consideration of cultural differences when designing structures and processes in international enterprises hasn't been presented so far. The structure of international production systems, especially their job sharing and collaboration, arose rather occasionally in former times and dependent on particular locations.

3 RESEARCH QUESTION

The relevance of cultural differences for the design of production, coordination and decision processes and related structures was already highlighted by Willemze [20]. He marks the consideration of cultural differences as „...challenge for social sciences and Industrial Engineering“.

This is also the basic question that stands for science as well as for practice: Which structures and which processes can be transferred to the different locations, which has to be adopted regionally and which general strategy should be used?

It isn't possible within this paper, to give a comprehensive answer to that question. Instead a frame-work is developed that helps for the clarification of the stated problems, derives research questions and links the different decisions within production management to different aspects of culture. At the same time some hypotheses for future research are derived.

4 THEORETICAL BASIS

4.1 Culture

The literature offers hundreds of definitions to the idea of culture. The influence of a culture on its members is reflected in Hofstede's definition of culture. He defines cultures as "collective programming of the mind which distinguishes the members of one group from another", [21]. Hofstede established – based on his empirical observations in many different countries – a classificatory scheme along the dimensions of power distance, uncertainty avoidance, individualism/ collectivism and masculinity/ femininity. Trompenaars and Hampden-Turner (1998) develop within their concept partly similar, partly different cultural dimensions, namely universalism/ particularism, communitarism/ individualism, neutral/ emotional, specific/ defuse, achievement/ ascription, human-time relationship and human-nature relationship.

A second cultural aspect of „doing business“ (corporate culture) describes the specific ways and means of how organizational members interact and communicate with each other within a confined setting. Basically every corporation is assumed to have an own, distinct corporate culture, or at least a certain congruency of various local cultures of parts of the organization. According to Schein [22] culture can be defined as a pattern of basic assumptions, invented, discovered or developed by a given group, as it learns to cope with its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore is to be taught to new members as the correct way to perceive, think, and feel in relation to these problems. Employees and executives move, particularly in multinational companies, within a "triangle of culture systems" that is spanned by corporate culture, the culture of the home country and the culture of the respective host country.

Therefore several characteristics for the description or classification of culture at different levels are available.

Based on this some conclusions can be drawn regarding the explanation of particular behavior and regarding the design of communication and organization structure.

4.2 Production management

In agreement with Schuh [23] for further consideration production shall be understood as creation of services for a special market. Production particularly production strategy substantially supports the competitiveness of an enterprise. Understanding management as design, control and development of systems this position can be transferred also to production systems. Production management can therefore be defined as the design, control and development of production and production systems, [23]. From this a reference framework can be developed, that contains a normative, strategic and operative level as well as the management aspects structures, activities and behavior. The particular tasks within production management can be derived from this framework, see for example [24].

Cultural influences have their effects especially on the behavior and on decisions of individual humans and groups. It is evident that the main sphere of influence is therefore on the operative level. But those decisions are made at the strategic and tactical level that influence the structures and processes at the operative level. At strategic and tactical decisions itself there are also cultural influences (e.g. uncertainty avoidance, time orientation etc.). But for further considerations these effects shouldn't be regarded.

4.3 Human behavior as link between culture and production management

Humans and their environment are inevitably carrier of culture. Objects can have characteristics that are dependent on the environmental culture or can get a different shaping accordingly to the cultural setting they are in. Furthermore there can be culture specific restrictions for the creation, destruction or transformation of these objects. In the sense of production management such objects can be: resources, buildings, machines, transportation facilities, etc. The planning, realization, execution and completing of production processes couldn't be done without communication. Whenever two or more people meet are supposed to work together communication will occur.

For behavior (in general) processes of motivation, emotion, perception and interpretation are significant. Action theory assumes that two aspects are substantial for behavior: (1) goal definition dependent on external and internal values and (2) regulation of goal oriented activities. When examining behavior and its underlying processes in detail, there are a lot of cultural influences on perception, situation interpretation, and different expectations. Cultural influences on cognitive processes are proposed for example by Redding, [25].

For problem solving and decision making in general there are two concepts that might be useful also for human behavior and decisions in production management. The first is the general problem solving cycle within complex planning constellations by Dörner; see [26]. The second is the model of actions in complex problem situations, proposed by von der Weth, [27]. These two concepts provide useful elements of behavior and decision making that could be linked with cultural influences. They occur mainly at the operative level but problem solving according to these models takes also place at the strategic level.

The problem itself fits in the framework for understanding production planning, scheduling and control, proposed by MacCarthy et al., [28]. For our purpose we must consider the carrier of decisions and behavior, which is the "unit", the process, which can be described for instance by

several stages, as well as several outcomes. Culture affects the unit as well as the process.

5 FRAMEWORK FOR THE COHESION OF CULTURE AND PRODUCTION MANAGEMENT

5.1 Elements and levels

Basically the interest is to make clear the influences of culture on production management. As we have seen, these influences take place at the operative level, actually on human behavior and decisions. Decisions and behavior could be analyzed and described at an individual, group and organizational level. For operative production management only the individual and the group level are considered. The strategic level is considered as a design level for substantial definitions regarding processes and structures. Therefore the identified cultural influences can be seen as boundary conditions at the strategic level.

Furthermore it is necessary to describe behavior and decisions (of individuals and groups) from a closer perspective. For these processes the available models (Dörner, von der Weth) can be applied.

In addition the characteristics of the situation, in which the actions take place, as well as the relevant results, have to be described. The situation and the task can be captured via general and psychologically well-founded features, e.g. complexity, variety, integrity, amount of objectives, feedback, dynamics etc. The results cover variables like effectiveness, efficiency, productivity, process time, planning quality, deviations, appointment compliance, delays as well as motivation and satisfaction of employees.

The influencing aspects are divided into culture in general and corporate culture. We can assume that corporate culture is influenced by general culture. The general culture can be described by several dimensions, according to Hofstede and Trompenaars & Hampden-Turner. Different shaping of the dimensions can be assigned to particular nations or cultural areas. For an aggregated view the seven categories of nations, proposed by Allinson and Hayes [29], seems to be helpful.

Corporate culture can be caught by the levels developed by Schein [22]. But for the purpose of this framework it seems to be more reasonable to operationalise culture in a more detailed way. A starting point is provided by the value classification of the „Organizational Culture Survey“, [30].

5.2 Interrelations

The identified aspects could now be integrated into an elaborated coherence model, see Figure 1

Some interrelations can be derived from the single theories as well as from logic conclusions:

- cultural influences on corporate culture
- cultural influences on individual behavior and decision making respectively problem solving
- cultural influences on group processes and group characteristics

6 PRACTICAL IMPLICATIONS AND EVALUATION

6.1 Classification of case studies

A multitude of international projects was executed within in the responsibility of the author's organization, see table 1. In each project different constellations could be found regarding the project execution conditions itself as well as the production management which was mainly the object of reorganization. There hasn't been an adequate framework available so far for their explanation and classification.

Table 1: Selected international projects concerning production management.

<i>Task</i>	<i>Enterprise</i>	<i>country</i>
implementation of an IE department	automobile manufacturer	Taiwan
examinations regarding the market entry	automotive suppliers	Thailand
process redesign	automobile manufacturer	Japan
implementation of a maintenance system	automobile supplier	Poland
design of assembly areas	module supplier	Great Britain Slovakia Mexico
layout planning	automobile supplier	USA
introduction of a new principle for production control	automobile supplier	USA
design of a logistics concept	automobile manufacturer	South Africa
design of the Supply Chain	automobile manufacturer	Brazil

Only the model proposed by Hofstede allows some assumptions about the relations between on the one hand process standardization, access to management, responsibility for failures etc. and on the other hand the cultural dimensions power distance, uncertainty avoidance and collectivism; see [31].

6.2 Further research

Future research should focus mainly on empirical studies which examine the proposed model. For that reason specific hypotheses can be derived from the general interrelations, for instance:

Table 2: Derived hypotheses for future research.

<i>culture's features</i>	<i>expected organization's and processes' features</i>
high uncertainty avoidance	many formal rules for process securing; higher information needs when making decisions in the filed of planning and scheduling
high power distance	centralization of decisions; goals are set by superiors rather than negotiated
universalism	tendency to collaborative decision making
collectivistic cultures	more decisions are made together; goals are assigned to groups rather than to individuals; group performance serves as achievement standard

Furthermore cultural influences on specific values that are anchored in corporate culture can be examined. Possible are the following relations:

- collectivism ⇔ reward systems
- power distance ⇔ communication
- time orientation ⇔ interpretation of effectiveness and efficiency
- achievement/ ascription ⇔ achievement orientation and reward systems

6.3 Design guidelines

From the stated interrelations design guidelines can be derived which can be used for decisions in strategic production management. Possible is the extension of Meffert's internationalization strategies with culture specific elements. For practical use the following analysis and evaluation steps make sense:

- comparison of native and host country regarding cultural differences
- analysis of relevant structures and processes regarding their influence of cultural dimensions

- estimation of the significance of the cultural differences respectively their consideration for company success and for employees
- definition of those structures and processes, that
 - could be transferred from native to host country (ethnocentric)
 - could be standardized globally (geocentric)
 - have to be adopted specifically for the host region (polycentric)

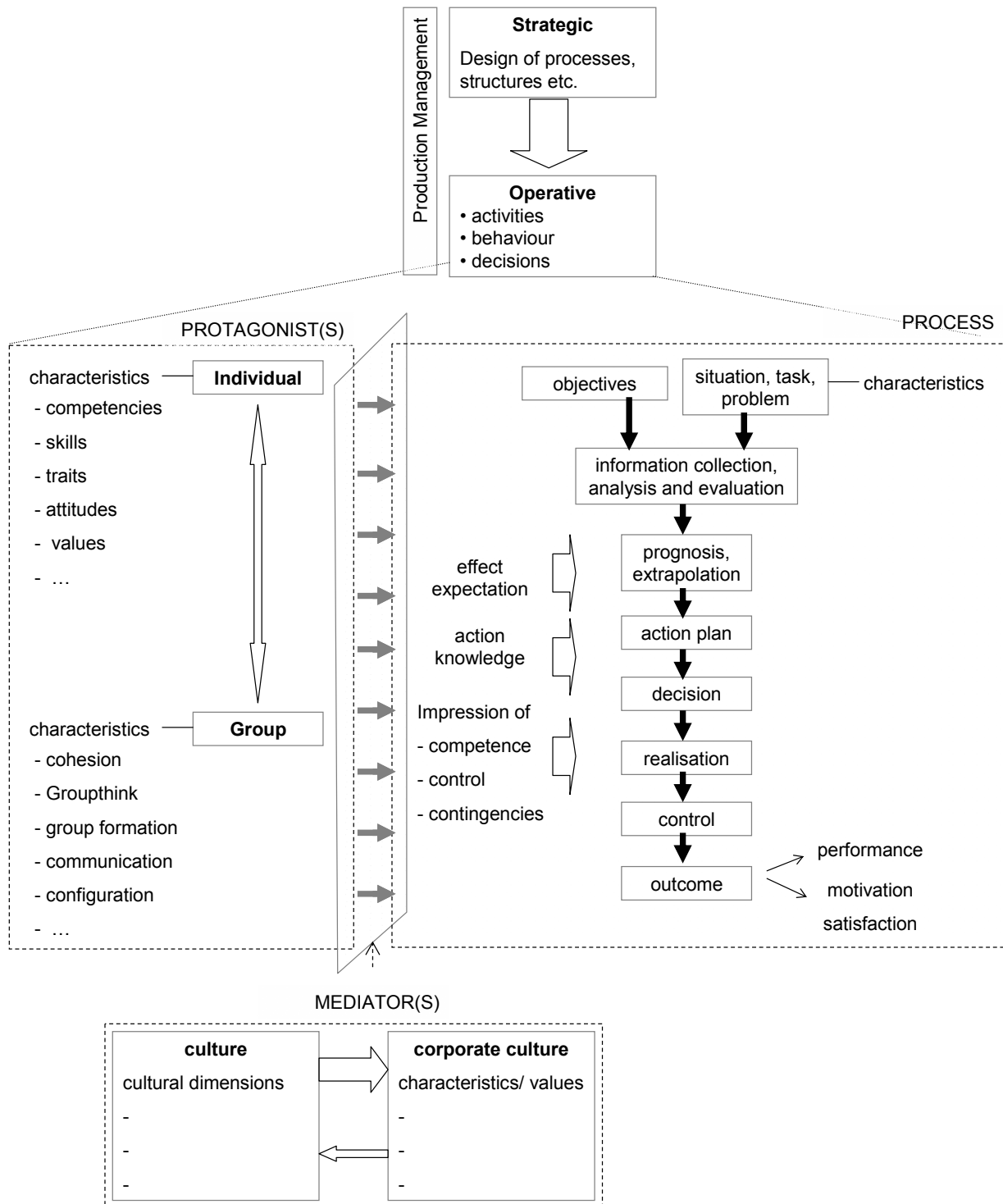


Figure 1: Coherence model culture - production management.

7 CONCLUSION AND OUTLOOK

The presented framework tries to link the aspects of production management with cultural influences. It could be shown that behavior and decisions (by individuals and groups) are highly dependent on the cultural background in which they take place. Thereby nation and region specific culture as well as corporate culture play a decisive role. The focus was currently on culture in general.

At different levels of production management there could be derived different cultural influences. These got integrated into a framework which should make the various interrelations transparent and available.

Till now are only a few case studies and some cross-sectional studies are available which supplement the proposed model. Next steps therefore are the empirical examination of the interrelations. The presented concept offers

- an approach for the derivation of research questions

- a framework for the strategic design of operative production management in an international context and the effect taking factors

The framework provides a contribution to the application of cultural theories to the field of production management. At the same time it opens the perspective of production management to influencing factors that are described as external but that are taking effects internally within the subjects that make decisions and show a particular behavior. For a holistic integration of production management and culture methods and concepts from different sciences like technical management, psychology, sociology etc. must be combined. A future perspective is for instance the extension of the framework with organizational and inter-organizational aspects, see figure 2.

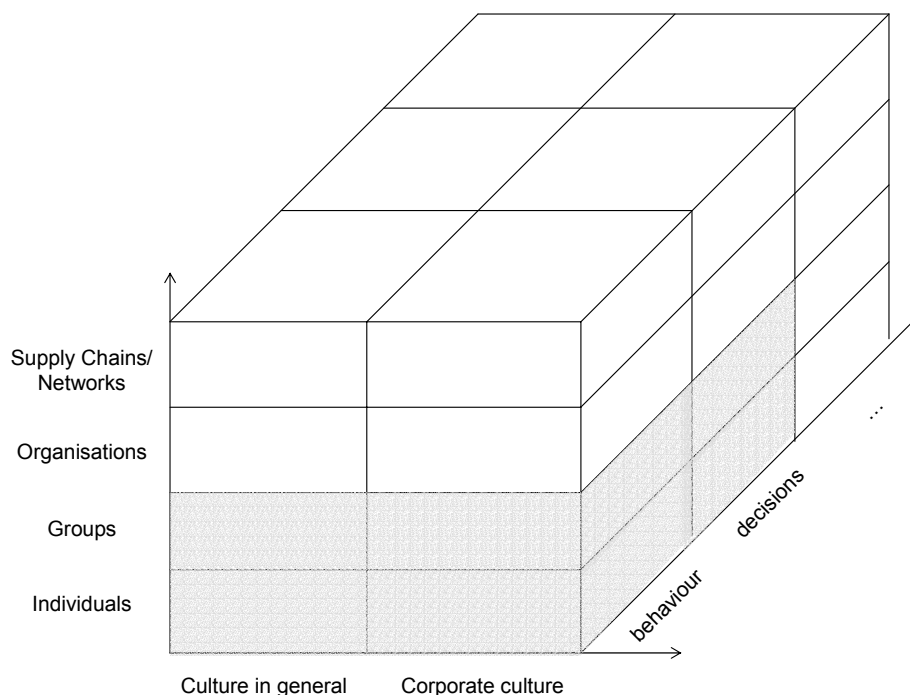


Figure 2: Extended scope of the framework.

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