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TEAMWORK DEVELOPMENT IN A TRADITIONAL MANUFACTURING ORGANISATION – A HOLISTIC PERSPECTIVE

ROZVOJ TÝMOVÉ PRÁCE VE VÝROBNÍM PODNIKU – HOLISTICKÁ PERSPEKTIVA

SHORT VERSION OF PhD THESIS

KEYWORDS
manufacturing, teamwork, development, performance measurement, holism

KLÍČOVÁ SLOVA
výrobní podnik, týmová práce, měření výkonnosti, řízení jakosti, holismus

Práce je uložena na oddělení pro vědu a výzkum FSI VUT v Brně

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1   INTRODUCTION

The way to manage effectively and efficiently organisations has been a big challenge for the last century. Starting from the Taylorist approach at the beginning of 20th century, through Japanese participative management in 50`s, up to knowledge and learning approach in today. The main objectives stay still the same: how to constantly improve performance in order to become faster, cheaper and more effective; and how to involve 100 per cent of the minds and passion of all people in identifying problems and resolving them [21]. This problem is aggravated with respect to pressure from current rapidly changing business environment. This environment is often described by adjectives as hyper competitive, global, customer-dominated, turbulent, and ever changing. On top of that, achieving operational excellence and developing industry foresights are equally challenging tasks. To keep the pace of change, organisations are forced to focus on [9]:

- Enhancement of quality – to satisfy an ever more demanding customer;
- Reduction of cost – to respond to increasingly intense global competition;
- Ways of developing their employees so that organisations can achieve competitive advantage and differentiation by the way their employees interact with their clients; gain access to employees` innovative ability and; enhance its skill base and its intellectual capital.

Systems perspective (or systems thinking) on managing organisations is another feature of modern quality management systems. Systems theory, developed by Von Bertalanffy [37], has been transferred to business language by Joy Forrester [14] and later by Peter Senge [30]. Senge`s publication `The Fifth Discipline' become one of the most influential books in the 90`s. The emphasis in systems thinking is given on the improvement of the whole systems and entire processes and on cross-functional approaches to manage those systems. This fact is also recognisable in ISO 9000 certification of quality management systems: previous functional standard ISO 9000:1994 has been transferred into process oriented one (ISO 9000:2000).

The pursuit of efficiency and economic growth is evident in the conviction that these are necessary ingredients of progress. Nevertheless, in the words of Handy [15], what we did not fully anticipate was the fact that "personal fulfilment would be so complicated by the pressures for efficiency". Human factor is the key factor in the quest to find a new management paradigm.

Team culture and team working seems to be a solution to the above-mentioned challenges. It is claimed by many authors that teamwork helps organisations to increase productivity and improve quality [21]. A team, as a social platform, helps to involve people though their participation on problem solving. This involvement in turn improves communication and the ownership of 'problem' reduces the resistance

to change efforts. On top of that, team learning, i.e. how we can learn as a collective is a new frontier for businesses today [24]. In a nutshell, it can be stated that teamwork can potentially help organisations to reach operational excellence, develop foresight in industry and improve the learning potential of the organisation.

1.1 THE NEED FOR TEAMWORK IN MODERN MANUFACTURING

The need for teamwork is evident in the pursuit for effective and efficient manufacturing organisations. Apart from already mentioned concepts (learning organisation, ISO 9000:2000), which can be understood as philosophies for all types of business, the concept of *agile manufacturing* is focused on manufacturing and teamwork plays the crucial and integral role in this concept. The concept of agile manufacturing has been introduced by the Iacocca Institute [17] and is defined as being "the ability to thrive in a competitive environment of continuous and unanticipated change." Therefore, to rapidly respond to a new environment, organisations have to apply the strategies leading to the response on the things that "cannot be controlled", such as: world markets, competition, economic issues, social factors, environmental issues, legislation, customer demands, cultural changes or shrinking world.

Agile manufacturing can be considered as a structure supported by three primary sources [17]:

- Innovative management structures and **organisation**;
- A skill base of knowledgeable and empowered **people**;
- Flexible and intelligent **technologies**.

To achieve the agility, it is necessary to integrate flexible technologies with highly skilled, knowledgeable, motivated and empowered workforce, therefore, a methodology of integration of people and technologies needs to be investigated. One of the ways is a HCIM architecture shown in Figure 1. This architecture enables the enterprises to implement natural groups around the processes within the organisation (internal groups 1,2,...n) and at same time provides the space for the involvement of users, customers or suppliers in the organisation (external group). Figure 1 furthermore stresses the importance of communication between those groups (human and technological buses) and depicts the interface between human and technological part of this architecture: *a Team – Technology Interface (TTI).*

To design an effective HCIM, the organisation has to consider (Kidd, 1994) especially an appropriate team structure, the nature of supporting software and; the technical communication and integration needs between supporting software modules. The research is focused on human aspects of HCIM, which is the teamwork development in manufacturing organisations.
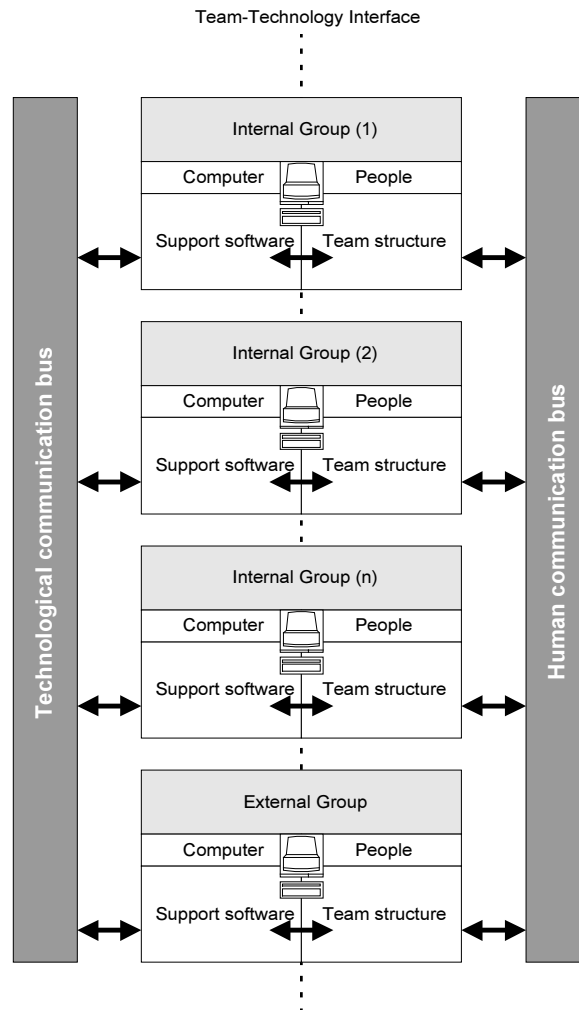
Figure 1: HCIM architecture

1.2 THE NEED FOR TEAMWORK IN MODERN MANUFACTURING

The broad topic area of interest of this study is ***teamwork.*** Teamwork is under focus of many researchers and a lot of techniques and approaches were developed yet there is still evidence from industry that organisations face multiple problems in order to implement teamwork culture. Many researchers suggest that teamwork is a multidimensional construct: organisational, team and individual dimension play equally important role [33] and simultaneous development of those critically affect teamwork development in organisations. Yet the literature review revealed the fact that the focus is given on developing teams as a unit of organisation and just a few studies concentrate on the influence the organisation has on teamwork development. This study is an attempt to fill this gap and investigate teamwork development from a holistic perspective; i.e. how organisations develop teamwork culture and how team members perceive this effort and how this is developed together. Specifically, this study examines teamwork development from systems thinking perspective looking at a team as a subsystem of an organisation.

The study is focused on manufacturing organisations with traditional functional organisational structure (as described by Rummler and Brache [27]). These organisations are built around departments where subordinate managers tend to perceive other functions as enemies rather than partners. This causes so-called "silo phenomenon" [27], which prevents cross-functional issues being solved at lower levels and where problems are escalated to the top of the silo.

2   AIMS AND OBJECTIVES OF THE THESIS

The aim of this PhD research is "to formulate a framework of teamwork development in manufacturing organisations with traditional functional organisational structure." The framework shall be:

- Based on factors affecting successful development of teamwork;
- Expressed by the conceptual model of teamwork development (CMTD);
- Applicable to measurement of teamwork development and performance in manufacturing organisations with traditional functional organisational structure where teamwork is in its infancy.

To fulfil its aim, the research has got following objectives:
- To develop appropriate research methodology;
- To undertake comprehensive literature review of teamwork development, systems inquiry and performance measurement;
- To determine factors affecting successful development of teamwork and to develop a theoretical framework of teamwork development;
- To investigate the matter of convergence and divergence of this framework in a case organisation;
- To critically review the theoretical framework and develop the conceptual model of teamwork development (CMTD);
- To recommend further work based on the results of this research.

3   RESEARCH METHODOLOGY

The research follows the process described by the research model (Figure 2). The research model illustrates the research process in sequence and is deliberately simplified in order to show the major stream of the research. Nevertheless, the process in practice was full of feedback loops and was going in fact backwards and forwards the model depicted here. The feedback was obtained during the research process through:

- ***International conferences and symposiums:*** the researcher actively participated at several conferences and symposiums (see Curriculum Vitae) where the research problem was discussed;

- *Personal communication:* personal communication at formal and informal research meetings provided author with the opportunity to gain other opinion and to integrate and improve his current level of understanding;
- *Feedback from publishing:* the process of disseminating the running project ended in valuable comments which help to significantly improve research project (see the list of published papers of the author);
- *Seminars:* the author participated at seminars organised by Czech Society for Quality (CSQ), North West Aerospace Alliance (NWAA), British Standard Institute (BSi), Institute for Quality Assurance (IQA);
- *Company visits and training* for companies.
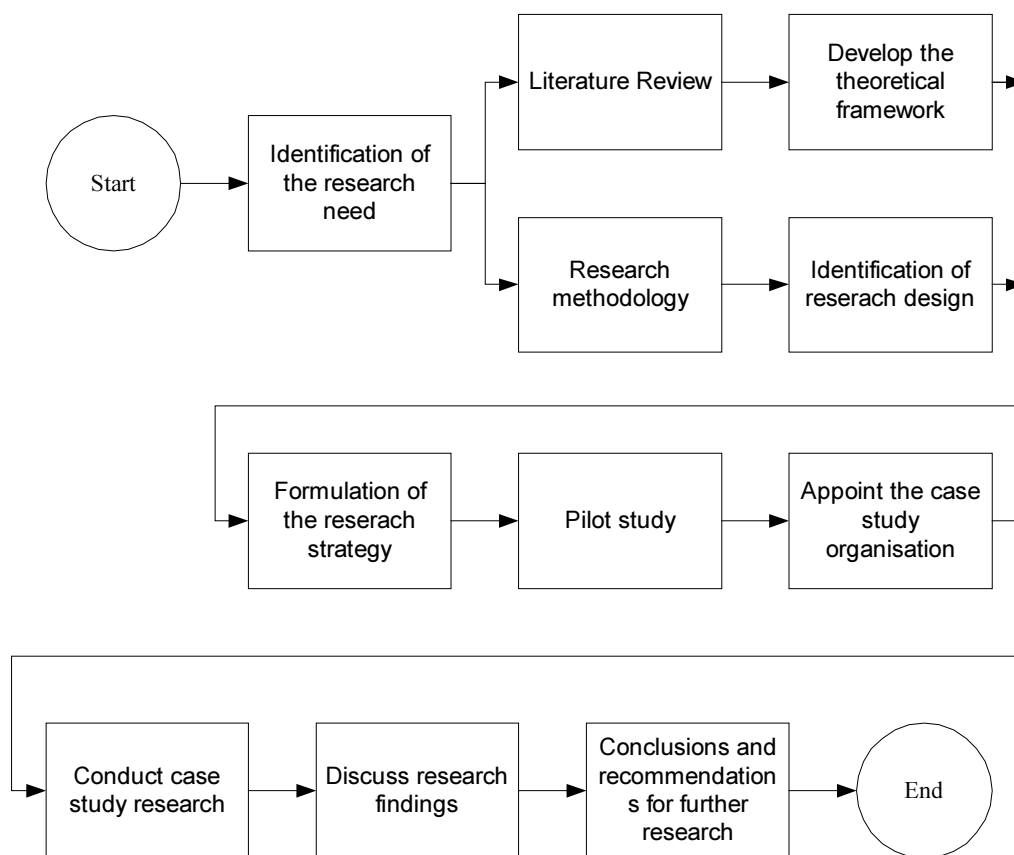
Figure 2: The research model

Clearly, every single box in the research process affects the development of other boxes in the research process. It has been argued by Checkland [7] that relevant research has to go around cycle 'ideas-experience'. The researcher applied this approach during the research process: the experience in the real-world forced the need to do other literature review, which led to new ideas, which were in turn experienced in real-world. Apart from that, the experience from the real-world contributed to better understanding of the literature.

3.1 PHILOSOPHICAL FOUNDATION OF THE STUDY

The research approach of the author can be classified as holistic [10]. Holistic approach recognises that human experience is complex and cannot be understood by reductionism (identifying and examining its parts) and that meaning in human experience is derived from an understanding of individuals in their social environments. Therefore, the researcher uses case study research design, which enables to conduct this type of research, which is qualitative in nature.

3.2 LITERATURE REVIEW

The literature review (LR) comprises the review of the current level of understanding how teams and teamwork (TW) concept should be developed. On top of that, LR discusses the concept of systems inquiry and performance measurement and the implications and influence those concepts have on TW development. Those concepts (system thinking and performance measurement) are investigated because of the holistic nature of the study. Firstly, systems inquiry deals with complexity and the way to capture it. It is revealed during the process of literature review, that systems thinking, particularly soft systems methodology (Checkland [7]) and causal loops (Forrester [14]; Senge [30]) has the potential to capture the complexity of teamwork development. Secondly, performance management is considered by quality gurus (Deming [11]) as an important discipline in implementation and development of any system. Indeed, literature review reveals that the lack of measurement instrument and focus on individual measures are one of the most common barriers in teamwork development.

NOTE: LR presented throughout this edition is limited to teamwork development. For complete review of the literature, see the complete PhD of the author.

3.3 THE THEORETICAL FRAMEWORK

The literature review discusses a vast array of methods and tools that are advocated for successful implementation of teamwork hence best practices for teamwork development. Based on this literature review, a theoretical framework for teamwork development is formulated and expressed by 7 factors (Chapter 5.1). This framework is understood as the hypothesis for further research. The hypothesis can be in other words stated as:

H_1: The theoretical framework will be applicable to organisations;
H_0: The theoretical framework will not be applicable to organisations.

Nevertheless, due to the philosophical foundations of the study (Chapter 3.1), the hypothesis is rather vaguely stated and the aim of the research is not to demonstrate the truth or falsity of the theoretical framework hence the hypothesis. The aim is to investigate the theoretical framework in order to find the matter of its convergence

or divergence for teamwork development in organisations with traditional functional organisational structure.

3.4 RESEARCH DESIGN

The research design can be classified as *case study research design.* More accurately, *single holistic case study* [36], which focuses on the research problem from systems perspective. The research utilises one single case study organisation for direct observation of and participation in teamwork development. The research is conducted in three phases:

- *Phase 01:* initial observations and entering the social world;
- *Phase 02:* intervention;
- *Phase 03:* team development**.**

Figure 3 schematically describes the case study research design, i.e. conducting the research through three phases of teamwork development and investigating the appropriateness of the theoretical framework hence 7 factors. Apart from the theoretical framework perspective, the change in the organisational performance and the effect of teamwork implementation between time A and B is evaluated.
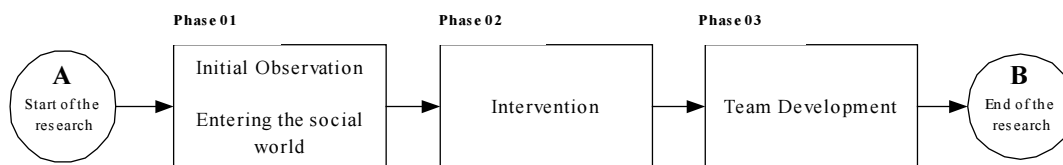

Figure 3: Case study research design

3.5 CASE STUDY ORGANISATION

Case study organization (CSO) is in many ways a traditional organisation situated in the North West of the UK manufacturing brass and steel fabricated components of high retail value. Approximately 230 people work on the manufacturing site, an old Lancashire Cotton Mill, selected for this research into team development. This site operates a two-shift production system, with limited overtime for the production personnel, which are managed in traditional hierarchical manner, with manufacturing manager, manager, cell leader and operator structure in operation. A reduction in profit margin over the last two years has been worrying, although this has not been considered as having significant impact upon the company; it is a trend that the senior management recognises as needing to be reversed. Therefore, the WCM (World Class Manufacturing) project has been started in October 2001. CSO has not, until recently, recognized the contribution that teamwork can add to the performance of the organisation. The introduction of a cross-functional team to improve quality performance has resulted in favourable change for the organisation

and accordingly, further teams have been set up with the task of improving the over-all manufacturing performance. These teams cut across the traditional functions in production and work on cross-functional issues.

4 CURRENT STATUS

Teamwork culture is widely acknowledged as a way to face today's turbulent environment and to create a flexible high performance organisation responsive to ongoing change. Nevertheless, the development of teamwork culture is difficult and numerous unknown questions emerge, which are yet to be answered despite a torrent of thoughtful papers concerning this subject.

4.1 TEAM DEVELOPMENT

There is a general agreement that teams progress through different stages (Syer and Connolly [34]; Katzenbach and Smith [16]; Robbins and Finley [26]; Stott and Walker [33]). These stages are defined within the "Form-Storm-Norm-Perform" model (FSNP model) of team development from Tuckman and Jensen [35]. The FSNP model describes key features in team development. The key features (characteristics) are natural steps of progression as a team "gels" together into a "single organism", able to tackle and solve problems efficiently, with the minimum amount of time and effort taken. Many authors accordingly use this model as the framework for their theories (Kur [19]; Rickards and Moger [25]) with similar conclusions. Other authors focus on the integration of different theories. For instance, Sheard and Kakabadse [32] propose the integrated team-development framework (ITDF). They draw from the research of Adair [1] and Tuckman and Jensen [35] and suggest monitoring development of teamwork in four dimensions (task, individual, group, environment) using the FSNP model by Tuckman and Jensen. Drawing from this theoretical basis and consequent research, Sheard and Kakabadse conclude that the significance of factors affecting team development differs during FSNP stages. For instance, during the forming stage 'clearly defined goals', 'priorities', 'communication' are the most significant factors whilst in the storming stage it is 'team dynamics'. 'Leadership' is most dominant during the norming stage and the performing stage requires focus on 'priorities', 'communication' and 'infrastructure'.

Another important issue in teamwork development is the composition of a team. Oakland [23] states that, no one person has a monopoly of good characteristics because they are often contradictory (i.e. good listener v. fluent communicator). Nevertheless, a team as a whole can posses most of the desirable characteristics. According to Belbin [4], the most successful teams have a distribution of the eight specific team roles (co-ordinator or chairman; shaper; plant; monitor-evaluator; implementor or company worker; resource investigator; teamworker; finisher). Other authors (Barger and Kirby [2]; Oakland [23]; Sharp *et al.* [31]) strongly

advocate the use of the Myers-Briggs Type Identificator (MBTI). Based on Jungian psychology, people can be categorised and grouped together according to the similarities in their natural preferences and people tend to develop particular behavioural habits and styles related to their preferences. The MBTI characterises an individual on four dimensions: Introvert-Extrovert (I/E), Sensing-Intuitive (S/N), Thinking-Feeling (T/F), and Judging-Perceptive (J/P). This corresponds to 16 possible personality types (Myers and McCauley [22]. Understanding of personality preferences and how it affects the way team members prefer to operate, help to understand and deal with other team members [31]. Nevertheless, there is often misplaced overemphasis on individual competence levels and not enough attention paid to team competency. For instance, Margerison [20] advocates a "Team competencies model" that highlights the nine key performance factors associated with work process necessary to ensure high performance:

1. *Advising* - gathering and reporting information;
2. *Innovating* - creating and experimenting with new ideas;
3. *Promoting* - exploring and presenting opportunities;
4. *Developing* - assessing and testing new approaches;
5. *Organising* - arranging how things will work;
6. *Producing* - making and delivering outputs;
7. *Inspecting* - controlling and auditing the working systems;
8. *Maintaining* - upholding and safeguarding standards and processes;
9. *Linking* - co-ordinating and integrating with others.

4.2 DEVELOPING A TEAM-BASED ORGANISATION

The previous section discussed team development and some theories and tools to strive for this development. Nevertheless, as some researchers assert (Stott and Walker [33]; Scholtes *et al.*[29]; Adair [1]) teamwork is a multidimensional construct that has more than one dimension and all those dimensions have to be taken into account. These dimensions are related to:

- The organisational dimension;
- The team dimension;
- The individual dimension.

It is necessary to recognise that conditions in one dimension critically affect conditions in other dimensions and that for effective team development every dimension needs to be developed [33]. A team is typically a part of the organisation and by the *organisational dimension* in our discussion it is meant the influence the organisation has on team(s) development and performance.

Beer [3] argues that organisations are "social inventions designed to achieve economic or other purposes while at the same time fulfilling members` needs." The

effectiveness of the organisational design must be judged by the congruence or fit "of social structures and processes with the individuals being recruited and the environment being served" and the following four organisational components must be congruent:

1. *People:* abilities, needs, values, and expectations of employees;
2. *Process:* the behaviours, attitudes, and interactions that occur within the organisation at the individual, group, and intergroup level;
3. *Structures:* the formal mechanisms and systems of the organisation that are designed to channel behaviour toward organisational goals and fulfil member needs (examples of these include job description, job evaluation system, organisation structure; policies; selection systems; control systems; and reward systems);
4. *Environment:* the external conditions with which the organisation must deal including its market, customers, technology, stockholders, government regulations, and the social culture and values in which it operates.

Beer [3] argues that these four components determine organisational culture. An organisational culture is understood as a characteristic of day-to-day environment as seen and felt by those who work there (Wallace *et al.* [38]; Choueke and Armstrong [8]). The research has shown that there is a relation between organisational culture and performance of the organisation. For instance, Choueke and Armstrong [8] investigated the influence of organisational culture on the performance of companies and conclude that in the majority of cases respondents who identified unique "cultures" in their organisations believed that those "cultures" had a positive effect on the performance of their companies. Wallace *et al.* [38] assert that all organisations have more than one culture: *formal culture* (idealised statements what beliefs and behaviour should be) and *informal culture* (actual beliefs and behaviours) and that informal character or culture is the key to understanding organisations.

Beer [3] and Sadri and Lees [28] emphasise the influence the external environment has on organisational culture. External environment influences an organisation directly (legislation, government regulations) and indirectly (expectations and values of employees). On top of that, the dynamics of the market dictates the pace of change in organisations and the frequency of the need for change influences organisational culture: organisations in fast changing environments have typically more loose structures whilst the organisations in slow changing environments have more bureaucratic structures. Beer [3] concludes that "successful organisations can be separated from unsuccessful ones by appropriateness of their structural form and management process to their environment." Sadri and Lees [28] report that organisations, which are able to maintain positive culture is likely to enjoy many benefits such as work environment that is more enjoyable, increased

levels of teamwork, sharing information, openness to new ideas, learning activations and such culture helps to attract and retain top employees. Barger and Kirby [2] summarise the essentials of organisational culture for success in a new environment as:

- Intelligence;
- Knowledge and experience;
- Ingenuity and creativity;
- Courage and willingness to take risks;
- Ability to be flexible, to try new things and new ways of living;
- Willingness to form new relationships, to trust people.

Similarly, *the individual dimension* plays equal importance in teamwork culture development. Many authors (Biberman and Whitty [5]; King and Nicol [18]; Butts [6]) call for spiritual change in the working environment and for the support of spiritual development of organisational members. King and Nicol [18] state that individuals are more than ever experiencing a lack of meaning in their lives and a sense of spiritual desolation and, thus, many people are embarking upon a spiritual journey and because work is a central part of our existence, much of this spiritual odyssey occurs within the context of the workplace. King and Nicol propose that "an organisation whose work environment responsively supports the quest for individual unity and direction, and fosters spiritual development, will realise heightened individual and organisational performance." They furthermore assert the following:

- There is a relationship between an individual's spiritual quest and the organisational environment; it is necessary for the organisation to be structured to support the individual's growth;
- In business relationships, individuals who are aware of their projections are able to develop an understanding of the source of interpersonal conflicts; consequently, they are more objective in assessing situations and making decisions and they are more accepting and less prone to blame others, thereby enhancing teamwork;
- The health of an organisation is dependent on the quality of its interpersonal relationships; when individuals became more emancipated from their individual views, they are more tolerant, willing to delegate work, to empower others and to be empowered;
- The nature of the organisation's structure in terms of the extent to which it acknowledges and responds to an individual's values and capabilities is key to organisational health and prosperity; the organisation possesses a powerful capacity to influence and be influenced by the individuals within it;
- By understanding and acting on spiritual paradigm, the organisation has the capacity to support the spiritual growth of its members and, as a consequence,

unleash its potential; the organisation can maximise the energy present in the dreams, skills and aspirations of those that make up its reality.

Butts [6] argues that "what is needed is sufficient clarity and theoretical understanding of the meaning of spirituality and how it can apply to work, especially in terms of personal satisfaction, peak performance, and overall business success that can also enrich communities, cultures, and the Earth itself." One useful way of integrating spirituality in the workplace is through sacred/ultimate/whole-system values, which enable the human spirit to grow and flourish. These time-honoured, life-affirming, and unifying values, which can also enhance profit and productivity, include:

- Truth and trust (which liberate the soul);
- Freedom and justice (which liberate creative and co-creative genius);
- Creativity (innovation);
- Collective harmony and intelligence (wholeness, synergy);
- Deeper meaning, and higher purpose.

4.3 MEASURING PERFORMANCE

The overall goal of performance management is to ensure that the organisation and all of its subsystems (processes, departments, teams, employees, customers, reward system) are working together in an optimum fashion to achieve the results desired by the organisation. Rummler and Brache [27] argue that performance management should strives to optimise results and alignment of all subsystems to achieve the overall results of the organisation and any focus of performance management within the organisation should ultimately affect overall organisational performance management as well. Rummler and Brache advocate a holistic approach to performance measurement that recognises three levels of performance:

1. *Organisational level:* organisational relations to its markets; the variables that affect performance at this level are organisational strategies, goals, objectives, organisational structure and deployment of its resources;
2. *Process level:* focused at work flow in the organisation; process level is connected to the output of the organisation; performance variable must meet the needs of the customer;
3. *Job/Performer level:* processes are managed by individuals; typical variables include hiring and promotion, job responsibilities and standards, feedback, rewards, and training.

Achieving the overall goal requires several ongoing activities, including identification and prioritisation of desired results, establishing the means to measure progress toward those results, setting standards for assessing how well results were

achieved, tracking and measuring progress towards results, exchanging ongoing feedback among those participants working to achieve results, periodically reviewing progress, reinforcing activities that achieve results and intervening to improve progress where needed (Zairi [39]). When the performance measurement system is designed, different types of performance indicators (PIs) should be included (Flapper *et al.*[13]):

- *Financial versus non-financial*: the traditional financial PIs alone are no longer sufficient to determine the company's health; other types of indicators are needed as well;
- *Global versus local*: global PIs are for top management, and local PIs for managers at lower levels;
- *Internal versus external:* internal PIs are used to monitor the performance of an organisation on aspects that are relevant for its internal functioning, whereas external PIs are introduced to evaluate the performance of the organisation as experienced by customers or to evaluate the performance of suppliers, where customer and supplier can also refer to different parts of one organisation;
- *Organisational hierarchy:* the vertical relations between PIs are often based on the organisational structure of a company; the hierarchy functions in a natural way to aggregate PIs at a certain level into a smaller number of indicators at the next higher level (a bottom-up approach);
- *Area of application:* this classification is department oriented: R&D, operations, sales and marketing; the idea behind this classification is that each department requires its own PIs.

One of the recently widely acknowledged tools for performance measurement is the EFQM Excellence Model (European Foundation for Quality Management; [12]). The EFQM model is a practical tool to help organisations assess their performance against criteria, which reflect the crucial areas for quality management systems. In doing so, the organisation can determine where they are on the path to excellence. EFQM model aids them in understanding the gaps and barriers, and helps stimulate solutions.

The EFQM model is a non-prescriptive framework based on nine criteria - five 'Enablers' and four 'Results'. The 'Enabler' criteria cover what an organisation 'does' whilst the 'Results' criteria cover what an organisation actually 'achieves'. It is recognised that there are many approaches to achieving sustainable excellence in all aspects of performance. The model suggests that 'excellent results with respect to Performance, Customers, People and Society are achieved through Partnerships and Resources, and Processes'. Each one of 9 criteria is supported by a number of sub-criteria. These are, similarly to criteria, provided with a description of what should be involved in the assessment process.

5 RESEARCH FINDINGS

5.1 CRITICAL FACTORS

Based on a vast array of literature on teamwork, systems inquiry and performance management the author (researcher) proposes 7 factors affecting successful implementation (FASI) of teamwork (Table 1).

Table 1: Factors affecting successful implementation of teamwork

Critical factor	Description
Organisational impact	This factor covers the impact the organisation has on team development such as creation of organisational culture supporting teamwork, allocation of time, space, resources; team reward and appraisal etc.
Defined focus	This includes specification of task, promised level of performance, deadline, customer and team deals with project management and future planning.
Alignment and interaction with external entities	Capability of a team to maintain the alignment with other teams, managers, suppliers, and customers.
Measures of performance	This factor covers the ability of the team to establish measures of performance that help to gauge the team's progress and task completion aligned to the customer requirements.
Knowledge and skills	This includes skills such as interpersonal and joint skills (dealing with conflict, dynamics of teamwork, how to conduct a meeting, effective decision making, communication skills, effective record keeping, leadership skills); analytical and statistical skills; improvement techniques and skills related to a particular job.
Need of the individual	This factor deals with individual needs and different personal preferences of team members in order to perform as a team member.
Group culture	Development of group culture based on empowerment, shared vision, creativity, participation, learning ability, trust and shared consensus.

5.2 CMTD MODEL

The 7 factors have been tested in the case study organization (Chapter 3.5) using the researcher design described in Chapter 3.4. The researcher investigated the teamwork development before and through the process of teamwork development (3 phases – see Chapter 3.4) over 9 month. The main focus was on 7 factors and their

relevance to the implementation process. The data to support this fact were collected through observation sheets, questionnaires and interviews with relevant people from the case study organisation. Based on this data, 7 factors were transformed into the conceptual model of teamwork development (CMTD; Figure 4). The CMTD particularly emphasis the influence of organisational impact and the interrelations among the factors. The CMTD is considered as a relevant model of teamwork development in organisations and those are crucial for this development. Therefore the researcher developed a self-assessment tool for teamwork development, which is presented in following section.
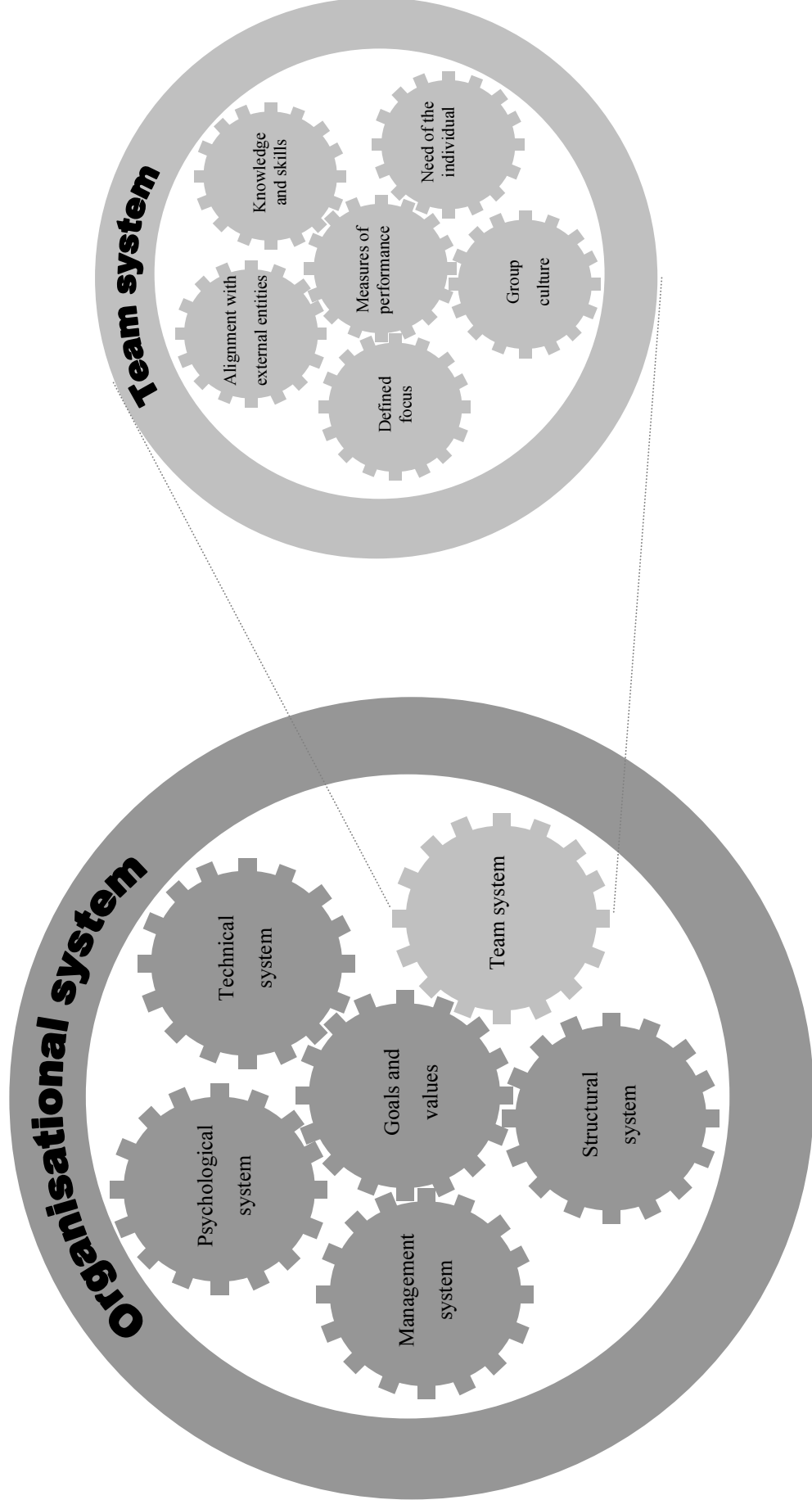
Figure 4: The conceptual model of teamwork development (CMTD)

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5.3 THE TEAM MODEL

In consequence of the above, the Teamwork Excellence Modified Model (TEaM model) is proposed (Figure 5). TEaM model is based on the framework of the EFQM Excellence Model (Chapter 4.3) and considers the factors for successful implementation of teamwork (Table 1) hence the conceptual model of teamwork development (CMTD). The criteria are partially modified to address more appropriately the teamwork culture objectives and are discussed within Table II. The model is therefore divided into three main categories:

- *Organisational enablers*: represent the organisational dimension in teamwork development; the criteria used for measurement are former EFQM criteria modified for teamwork; describes how results in terms of teamwork culture development are achieved;
- *Team enablers*: a new "box" in the model; are based on 7 factors (Table 1); describes how results within a team are achieved.
- *Team results*: identical description as in the EFQM; describes what the team has achieved and is achieving.
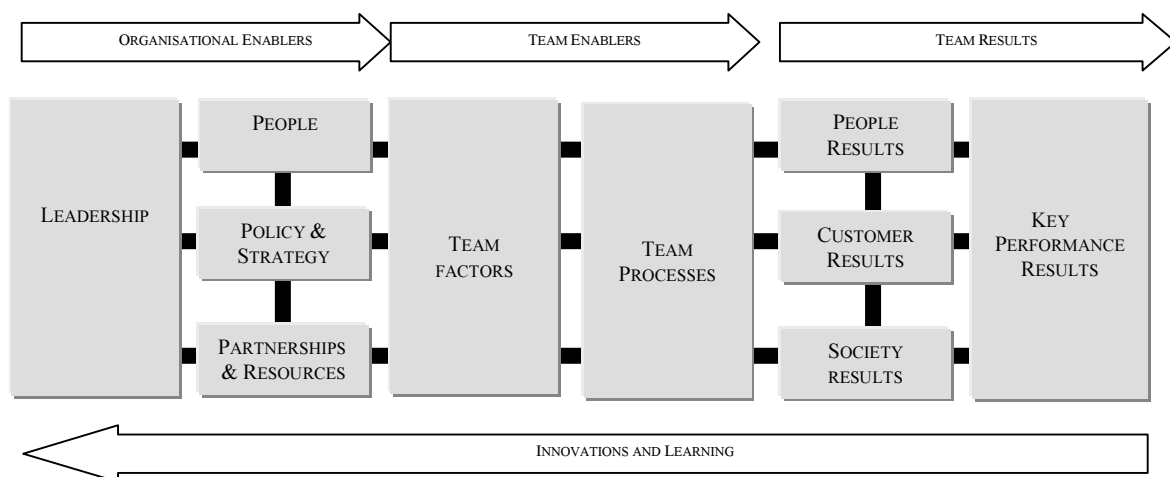
Figure 5: The TEaM Model

Table 2: Key areas and critical factors of the TEaM model

Key areas (criteria)	Description of critical factors
1. Leadership	1.1 Leaders develop the teamwork culture within the organisation; 1.2 Leaders are personally involved in ensuring that teamwork culture is developed, implemented and continuously improved; 1.3 Leaders are involved with team leaders and team members; 1.4 Leaders motivate, support and recognise the teams.

2.	**Policy and Strategy**	2.1	Policy and strategy for teamwork culture development (P&S) is based on the present and future needs and expectations of individuals, teams and organisation as the whole;
		2.2	P&S is based on information from performance measurement, research, learning and creativity related activities;
		2.3	P&S is reviewed and updated;
		2.4	P&S is communicated and implemented.

Knowledge and full potential of people and teams is managed, developed and released and so:

3.	**People and Teams**	3.1	People resources are planned, managed and improved;
		3.2	People's knowledge and competencies are identified, developed and sustained;
		3.3	People and teams are involved and empowered;
		3.4	People, teams and the organisation have a dialogue;
		3.5	People are rewarded, recognised and cared according to their individual as well as team results.

The organisation plans and manages teamwork and thus:

4.	**Partnerships and Resources**	4.1	Partnerships among different teams are managed;
		4.2	Finances and other resources for teams are managed;
		4.3	Technology is managed;
		4.4	Information and knowledge are managed.

5.	**Team Factors**	5.1	Organisational impact;
		5.2	Defined focus;
		5.3	Alignment and interaction with external entities;
		5.4	Measures of performance;
		5.5	Knowledge and skills;
		5.6	Needs of the individual;
		5.7	Group culture;

6.	**Team Processes**	6.1	Processes are systematically designed and managed;
		6.2	Processes are improved, as needed, using innovation in order to fully satisfy and generate increasing value for customers and other stakeholders;
		6.3	Products and services are designed and developed, based on customer needs and expectations;
		6.4	Products and services are produced, delivered and serviced;
		6.5	Customer relationships are managed and enhanced.

7.	**People and Team Results**	7.1	Perception measures;
		7.2	Performance indicators.

8.	**Customer Results**	8.1	Perception measures;
		8.2	Performance indicators.

9.	**Society Results**	9.1	Perception measures;
		9.2	Performance indicators.

10.	**Key Performance Results**	10.1	Key performance outcomes;
		10.2	Key performance indicators.

5.4 COMPUTER AIDED DATABASE FOR THE TEAM MODEL

The TEaM model is presented in the PhD thesis in the form of database, which aims at self-assessment of teamwork development in organisations. The purpose of this electronic version of the TEaM is to provide a software tool, which would be applicable for the organisations wishing to monitor and assess their teamwork development. The electronic version uses the EFQM methodology for direct assessment of factors described in Table 2. For more details refer to the original thesis.

6 CONCLUSIONS

Teamwork is increasingly becoming a prerequisite to face a turbulent environment in many manufacturing organisations, yet there are many obstacles to its successful implementation particularly in organisations with traditional functional organisational structure (Chapter 1.1). This study has presented the theoretical framework of teamwork development (Chapter 5.1) and through case study research (Chapter 5.2), the researcher concludes with the conceptual model of teamwork development (CMTD), which is described in Figure 4.

CMTD is the result of the research conducted and presented in this study and is a model of factors affecting successful development of teamwork in manufacturing organisations limited to particular organisations as described in Chapter 1.1. CMTD significantly reflect the main barriers to development of teamwork and the research has demonstrated that successful implementation can be achieved albeit the process of team development is recognised as taking considerable effort to maintain.

It is considered that the approach presented in this study of teamwork development is a useful contribution to continuous improvement efforts of managers, leaders, team members and facilitators of teams within organisations. Consequently, the journey toward a team-based organisational paradigm is a significant challenge in an increasing number of organisations. To support this effort, this study furthermore proposes the Teamwork Excellence Modified Model (TEaM model, Figure 5) in Chapter 5.3 and its electronic version (Chapter 5.4). TEaM model is based on the framework of the EFQM Excellence Model and considers the conceptual model of teamwork development (Figure 4) and can be used in organisations needing to, and committed to establishing the measurement of their teamwork culture and hence performance opportunities. The results from the TEaM model assessments hence provide the information necessary for the improvement in all dimensions of teamwork culture development, i.e. organisational, team and individual. The use of the proposed framework will furthermore lead towards the improvement of communication, knowledge exchange, development of understanding of organisational vision and at the same time reducing the resistance to change efforts.

Likewise, for many organisations, researchers and management experts alike, a positive teamwork culture is seen as an essential enabler to effective organisational change. Hence, the conceptual model of teamwork development (CMTD) and the TEaM model presented and demonstrated in this study if adopted by organisations counted to change management through teamwork culture development is considered by the researcher as an essential tool in developing high performance teams and consequently developing a high performance organisation.

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10 ABSTRAKT

Cílem této doktorandské práce je formulovat rámec rozvíjení týmové práce ve výrobních podnicích s tradiční funkční organizační strukturou. Tento rámec je postaven na klíčových faktorech ovlivňujících tento rozvoj a je vyjádřen koncepčním modelem (the conceptual model of teamwork development – CMTD).

Doktoradské práce analyzuje řadu vědeckých metod aplikovatelných pro tento výzkum a jejich filozofické základy. Na základě této analýzy byla zvolena případová studie (case study) jako výzkumná metoda. Analýza současného stavu řešené problematiky se zaměřuje především na 3 klíčové oblasti: rozvoj týmové práce, systémový přístup a měření výkonnosti. Na základě této analýzy je formulován teoretický rámec, který je postaven na 7 faktorech ovlivňujících úspěšný rozvoj týmové práce (vliv organizace, definování cíle, měření výkonnosti, shoda s ostatními týmy a organizací, týmová kultura, požadavky jednotlivců, znalosti a dovednosti). Tento rámec je zkoumán v případové organizaci (case study organisation).

Samotný výzkum byl prováděn v případové organizaci po dobu 9 měsíců kdy doktorand aktivně působil v dané organizaci a pozoroval rozvoj týmové práce. Tento rozvoj byl zkoumán ve třech stádiích (výzkum před implementací týmové práce, průběh její implementace a rozvoj týmů a týmové kultury v případové organizaci). Doktorand se zaměřil na výzkum relevance teoretického rámce. Závěry výzkumu jsou diskutovány v kapitole 6 doktorandské práce, ve které je původní teoretický rámec modifikován na základě závěrů případové studie. Doktorand formuluje koncepční model (the conceptual model of teamwork development – CMTD), které je postaven na klíčových faktorech ovlivňujících rozvoj týmové práce v tradičních funkčně orientovaných výrobních podnicích. Tento model může být také používán jako nástroj měření výkonnosti a kontinuální zlepšování. Takovýto nástroj, TEaM model (Teamwork Excellence Modified Model) je popsán v závěru doktorandské práce, kde doktorand ukazuje jak modifikovat rámec EFQM (European Foundation for Quality Management model) s využitím závěrů tohoto výzkumu, jak implementovat tento modifikovaný model a představuje také počítačovou podporu pro užití TEaM modelu jako databázi pro hodnocení výkonnosti.