

## **THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON INTRA-ORGANIZATIONAL COORDINATION PROTOTYPE AND DESIGN OF WEB PORTAL TECHNOLOGY**

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### **Abstract**

*It is widely believed that information and communication technology (ICT) enables organizations to decrease costs and increase capabilities, effectiveness, and thus enables to shape organizational coordination. This paper describes a prototype modeling with the impact of ICT on structural coordination of information databank. The framework used consists of three perspectives: structural coordination intra-link, ICT, and content management services for the processing of which coordination is required. Organization structural coordination is defined and the impact of ICT is indicated. So far, ICT is considered to be a driving force. There are, however, other aspects that have an influencing impact on intra- coordination. Those aspects are described and by combining those with the possibilities of ICT, the web portals are presented.*

**Keywords:** *information and communication technology, intra-coordination, local area network, portal, and structural web content development*

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### **Introduction**

Organizations must continuously change due to ongoing changes in the environment (Marielle den H. and Henk G. S cited 2001). In trying to improve the performance of the organization, the focus has shifted over the past years from the unit's level towards the intra-organizational level. This growing interest in intra-organizational relationships can be illustrated by several interrelated business trends(Marielle den H etal, 2001), some of which are presented below.

- A first business trend is the use of information and communication technology (ICT) to decrease costs and increase capabilities. Developments in ICT such as the World Wide Web, Electronic Data Interchange, and electronic mail can be seen as enablers to cross organizational boundaries more easily when dealing with information intensive processes. From the early efforts to support existing inter-organizational processes (e.g. the ex-change of documents between organizations), the focus has shifted to the emergence of new ways of doing business. Examples of this include the introduction of electronic trading markets, electronic auctions, and electronic bookstores. ICT has developed from a minor force supporting the inter-organizational processes into a dominant force for shaping these processes.
- Outsourcing of secondary activities is another business trend. Organizations concentrate on their core business and specialize in main activities to reduce costs. This is a consequence of operating in a turbulent environment. Turbulence consists of two components: instability and randomness. Instability refers to the frequency of change. Randomness refers to the unpredictability of both the frequency and direction of change.
- Globalization as a business trend has been realized by international trade agreements such as the European Union, the General Agreement on Tariffs and Trade (GATT), and the North American Free Trade Agreement (NAFTA). This has resulted in a worldwide market in which organizations must compete.

The business trends mentioned above indicate changes especially at the inter-organizational level: increasing and changing communication between units, shifting boundaries, and geographically expanding relationships between departmental. Although different in nature, the changes all affect the coordination between. The focus of this paper is on intra-organizational coordination structures, which will be elaborated on later in this paper.

## **Reviews**

Several proven theories and technologies have been used to design and come up with the web portal and thereby consistently review literature we come up with a framework. The framework is presented in figure 1. The framework consists of three perspectives, each of which will be discussed in a separate section (section 1, 2, and 3). By combining the notions on the three perspectives, the prototypes of web portal are presented with which the impact of ICT on intra-organizational coordination structures can be predicted. Meanwhile, a Local Area Network was used to build a centralizer Information System. The paper ends with conclusions and recommendations for future research.

*Figure 1. A developmental framework resulting to ICT impact at organizational level*

### **ICT Readiness**

Since 2000, the Economist Intelligence Unit has assessed the world's largest economies on their ability to absorb information and communications technology (ICT) and use it for economic and social benefit. Previously titled the "e-readiness rankings", in 2010 the study is being renamed as the "digital economy rankings", to reflect the increasing influence of ICT in economic (and social) progress. Seventy countries are covered in this annual benchmarking exercise. The digital economy rankings assess the quality of a country's ICT infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit. When a country uses ICT to conduct more of its activities, the economy can become more transparent and efficient. Our ranking allows governments to gauge the success of their technology initiatives against those of other countries. It also provides companies that wish to invest or trade internationally with an overview of the world's most promising business locations from an ICT perspective mentioned in a report from the Economist Intelligence Unit 2010.

Over 100 separate criteria, both qualitative and quantitative, are evaluated for each country by the Economist Intelligence Unit's team of analysts. These criteria are scored on their relative presence in a country's economic, political or social landscape. The categories, and the individual criteria within them, are weighted according to our assumptions of their relative importance in fostering a country's information economy. "Countries are now challenged to effectively stimulate the use of technology by the vast majority of their citizens, businesses and governments in order to remain competitive," says Peter K. (2010).

## **ICT Use**

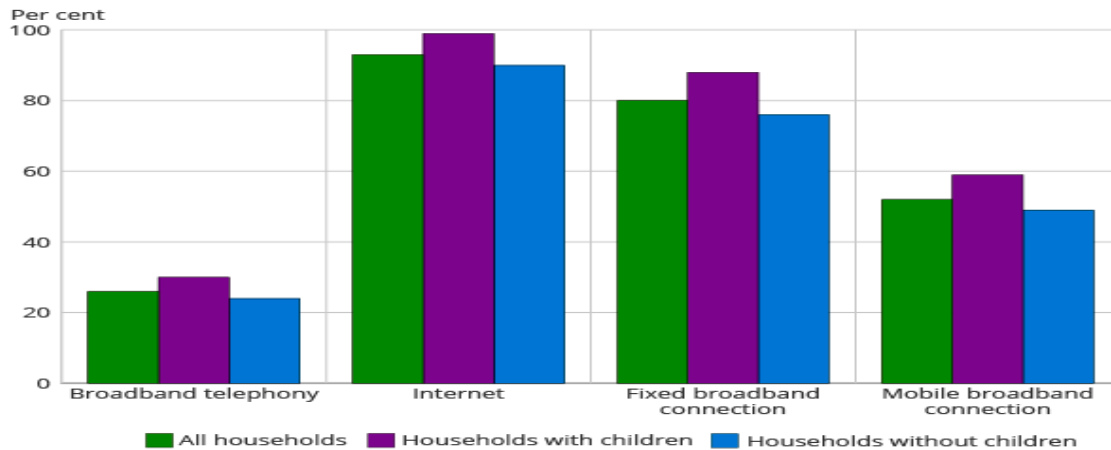
**Using panel data for 161 countries, we explore the determinants of cross-country disparities in personal computer and Internet penetration. We find evidence indicating that income, human capital, the youth dependency ratio, telephone density, legal quality, and banking sector development are associated with technology penetration rates. Estimates from Blinder–Oaxaca decompositions comparing rates in the developed-country total to developing countries (Total, Brazil, China, Indonesia, India, Mexico, and Nigeria) reveal that the main factors responsible for low rates of technology penetration rates in developing countries are disparities in income, telephone density, legal quality, and human capital. In terms of dynamics, our results indicate fairly rapid reversion to long-run equilibrium for Internet use, and somewhat slower reversion for computer use cited by Menzie D., Robert W. 2010.**

## **Activity Utilizations**

The percentage of households and the population with only mobile broadband is 8 per cent; an increase from 7 per cent last year. The whole increase is linked to the use of mobile phones with high speed Internet access. Due to this increase in mobile broadband there is also an increase in total broadband Internet access from 91 per cent of the population last year to 92 per cent this year.

## **Use Of Computers And The Internet**

**Figure 1. Percentage with access to different ICT, by household type. 2nd quarter of 2014**



Source: Statistics Norway.

A total of 95 per cent of the population have used a computer during the last three months; the same as last year. While almost everyone under 65 years has used a computer during the last three months, the corresponding figure for people aged between 65 and 74 years was 76 per cent; an increase from 73 per cent in 2013.

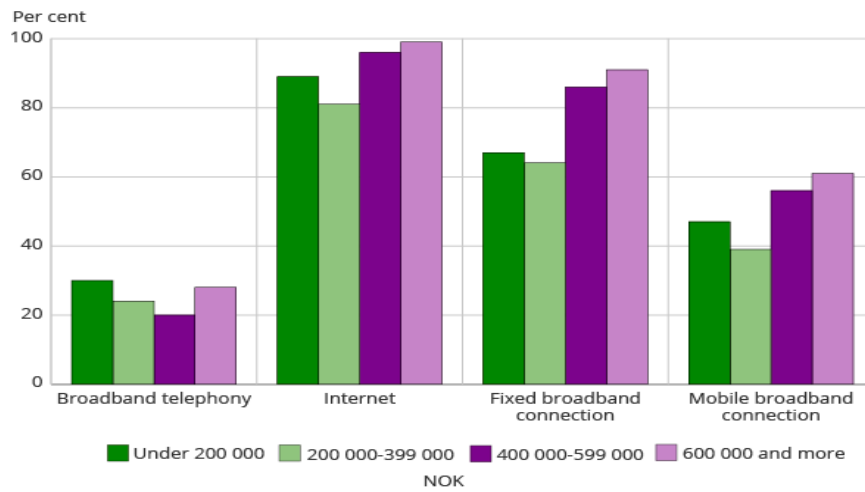
*Figure 2. Source: statistics Norway (Percentage with access to different ICT, by Household type 2<sup>nd</sup> quarter of 2014)*

The figures for Internet use in the last three months show the same trend. Almost everyone in the age groups younger than 65 years is using the Internet and in the age group 65-74 years the figure increased from 70 to 77 per cent in the last year.

### **Activities Over The Internet**

Approximately 90 per cent of the population used Internet banking and e-mail. The same percentage used the Internet to read online newspapers and to search for information on, for example, goods, services, travel, accommodation etc. in the last three months as of the 2nd quarter of 2014.

Figure 2. Percentage with access to different ICT, by the total gross income. 2nd quarter of 2014



Source: Statistics Norway.

### *Figure 3. A graph showing percentage of Activities over the Internet*

#### **Use of e-commerce**

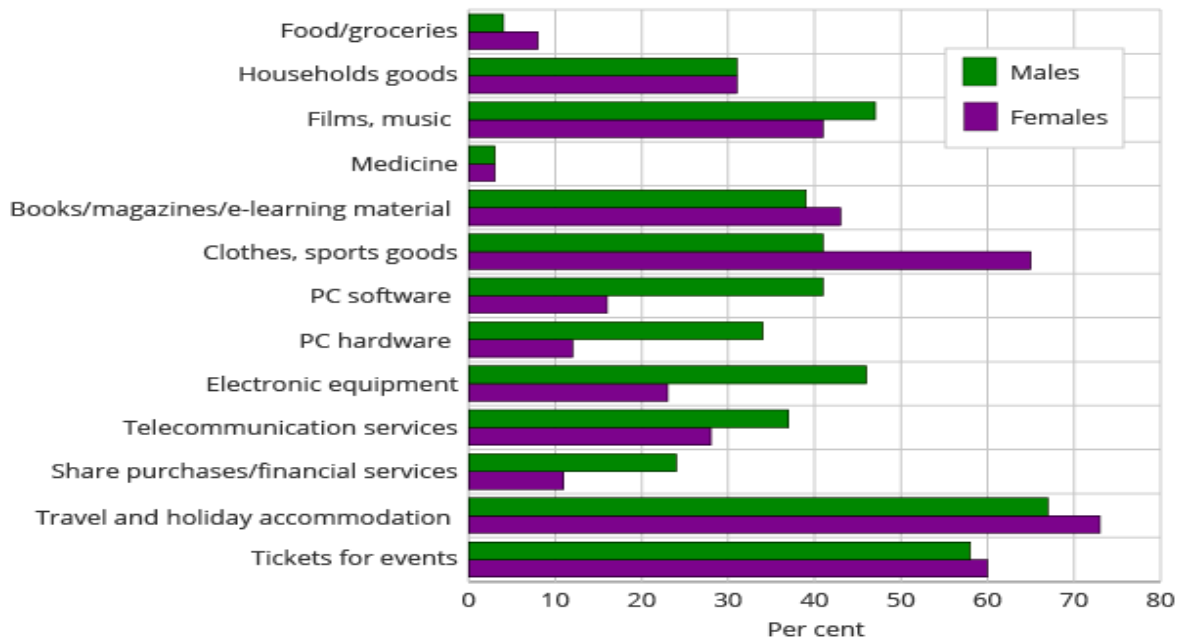
Buying and ordering goods or services for private use over the Internet is growing in popularity. The total share of the population that has made an e-commerce transaction during the last 12 months has increased to 77 per cent from 73 per cent last year. About 7 in 10 Internet shoppers have bought or booked travel or holiday accommodation.

#### Extensive use of public authorities' websites

Eighty-five per cent of persons aged 16-74 have interacted with public authorities over the Internet during the last 12 months; an increase from 79 per cent last year. Seventy-

eight percent have obtained information from public authority websites. Sixty-three per cent downloaded official forms and 58 per cent sent completed forms to public authorities.

**Figure 4. Types of goods and services bought or ordered over the Internet for private use, the last 12 months, by sex. 2nd quarter of 2014**



Source: Statistics Norway.

*Figure 4. Source: Statistics Norway (shows the level at which goods and services are rendered over the ICT technology)*

### **ICT Capabilities**

[Vinit P.](#) and [Pejvak O.](#) (2014). cited that, Prior studies have argued that small firms with dynamic capabilities can revise and reconfigure their internal resources to meet the uncertainties of their business environment. However, there is a lack of understanding of how they can develop such critical capabilities. In this study, we propose that small firms can employ information and communication technology (ICT) capabilities as a facilitator for developing dynamic capabilities. Thus, the study builds on resource-based view (RBV) literature and information systems (IS) literature by examining the influence of ICT capabilities on the dynamic capabilities of small firms.

### **The Impact Of ICT On Organizational Coordination**

The impact of ICT on organizational coordination cannot be defined easily, since coordination structures cannot be prescribed but have to evolve over time. However, it is expected that some modeling techniques can be distilled from theory to predict the impact of ICT on organization structures. A framework has been used to consistently come up with the prototyping system. So far, ICT is considered to be a driving force in changing coordination structures. There are, however, other aspects that have an influencing impact on intra-organizational coordination. Cited by Den Hengst, Marielle; Sol, Henk G. 2001.

### **Prototype Framework**

The focus of this paper is on coordination structures. A structure, at an abstract level, can be viewed as a collection of elements and the set of relationships that connect these elements (Monge & Eisenberg, 1987).

Prototyping is the process of building a model of a system. In terms of an information system, prototypes are employed to help system designers build an information system that intuitive and easy to manipulate for end users. Prototyping is an iterative process that is part of the analysis phase of the systems development life cycle.

During the requirements determination portion of the systems analysis phase, system analysts gather information about the organization's current procedures and business processes related the proposed information system. In addition, they study the current information system, if there is one, and conduct user interviews and collect documentation. This helps the analysts develop an initial set of system requirements.

Prototyping can augment this process because it converts these basic, yet sometimes intangible, specifications into a tangible but limited working model of the desired information system. The user feedback gained from developing a physical system that the users can touch and see facilitates an evaluative response that the analyst can employ to modify existing requirements as well as developing new ones.

Prototyping comes in many forms - from low tech sketches or paper screens(Pictive) from which users and developers can paste controls and objects, to high tech operational systems using CASE (computer-aided software engineering) or fourth generation languages and everywhere in between. Many organizations use multiple prototyping tools. For example, some will use paper in the initial analysis to facilitate concrete user feedback and then later develop an operational prototype using fourth generation languages, such as Visual Basic, during the design stage.

### **Some Advantages of Prototyping**

- Reduces development time.

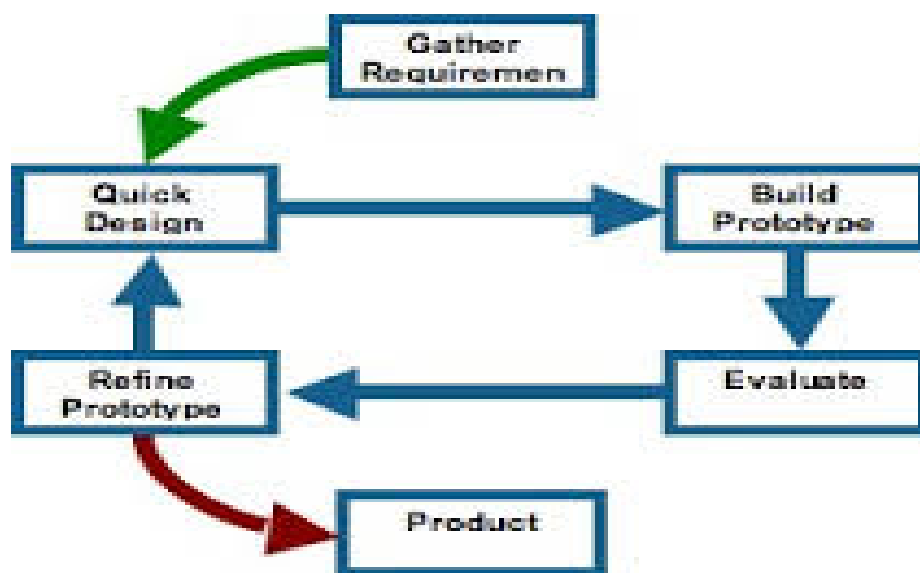


- Reduces development costs.
- Requires user involvement.
- Developers receive quantifiable user feedback.
- Facilitates system implementation since users know what to expect.
- Results in higher user satisfaction.
- Exposes developers to potential future system enhancements.

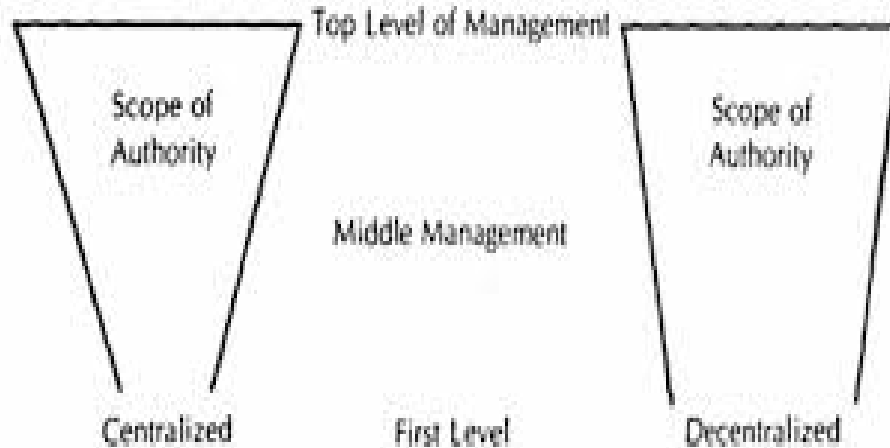
### Some Disadvantages of Prototyping

- It can lead to insufficient analysis.
- Users expect the performance of the ultimate system to be the same as the prototype.
- Developers can become too attached to their prototypes
- It can cause systems to be left unfinished and/or implemented before they are ready.
- It sometimes leads to incomplete documentation.
- If sophisticated software prototypes (4th GL or CASE Tools) are employed, the time saving benefit of prototyping can be lost.

Therefore, in an intra-organizational coordination structure, the elements are the units. The relationships between those units can be associated with different perspectives such as networks. These perspectives are visualized in figure 5. The link started with *data gathering* to *Quick design* to *Build prototype* to *Evaluate* to *Refine model* to *final product*.



*Figure 5. A flow direction of prototyping*



Meanwhile, in Figure 1 demonstrates that the three perspectives are inter-related and have an influencing impact on each other. The sections that follow will elaborate on each of the three perspectives and will also describe the influencing impact that each of the perspectives has on the other perspectives. There are many different types of inter-organizational coordination structures, but they can be categorized into two basic coordination structures (Marielle den H et al, 2001). A hierarchical coordination structure is characterized by long lasting relationships between organization with fixed rules of behavior and clear authority relationships. And Hybrids which is vary between the extremes of pure markets and pure hierarchies. One aspect of coordination structures are identified for this purpose that is, centralized versus decentralized. Strict hierarchies have a dominated structure, often with a few participants, and with long term agreements. In dealing with information systems, public sector organizations have to cover eight main areas of responsibility: information systems planning, organizational structures and staffing, data management, computing and data management architecture, information systems development, information technology acquisition, training, and technical support. Adopting a centralized approach to these responsibilities can bring efficiency benefits, but requires some severe constraints to be overcome. Adopting a decentralized approach can help spread computing in the organization, but is often wasteful. A ‘core-periphery’ approach to public information systems, combining both central and local action, is therefore recommended as being most effective. Details of such an approach are described below.

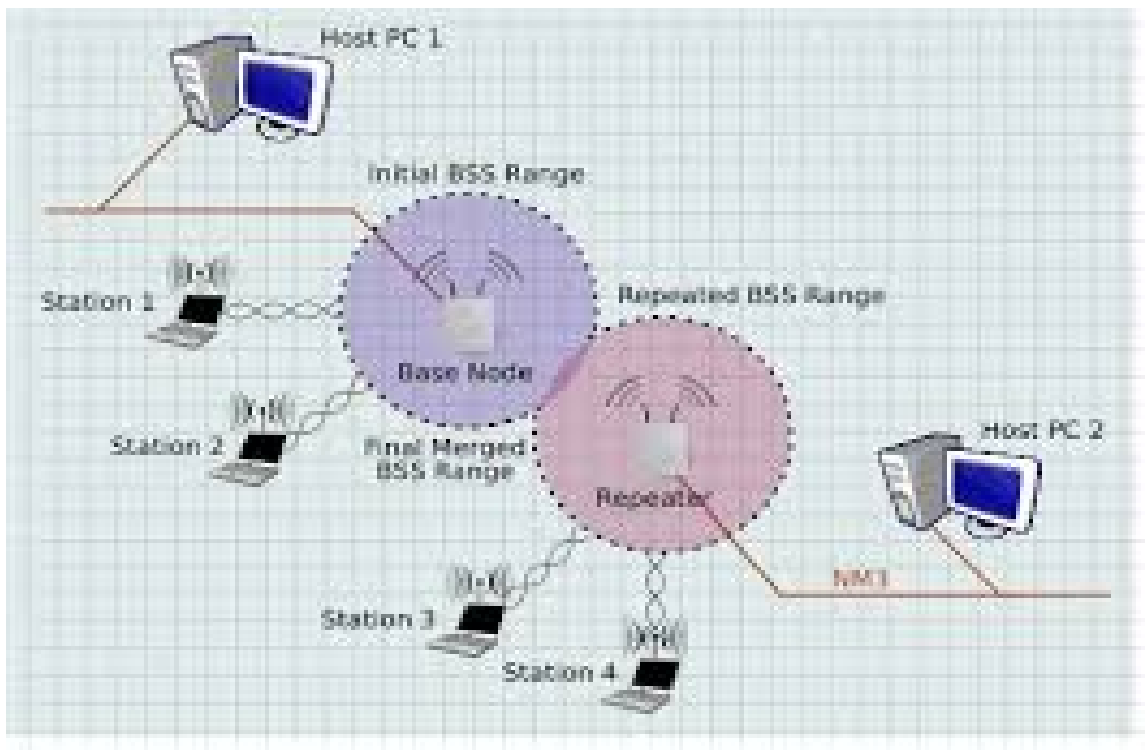
*Figure 6. Shows the scope of authority in centralized and decentralized system*

Therefore, the level of Coordination structures can be classified into decentralized and centralized structures (Marielle den H et al, 2001). In a decentralized structure, we have  $n$

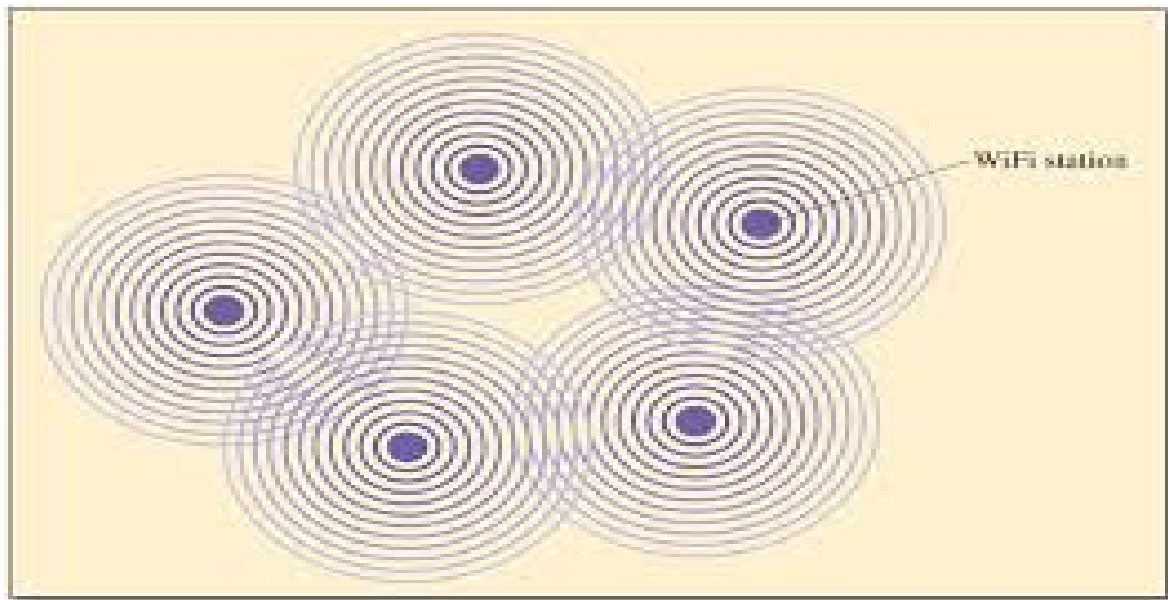
to contact  $n$  to perform transactions, whereas in a centralized structure transactions between  $n$  and 1 formulation.

## Development of LANs Network

Server Virtualisation and Cloud Computing, maintaining network performance becomes more critical than ever. Virtualisation can help organisations reduce costs and streamline operations, but inevitably this drives higher server utilisation rates, more network I/O, and distributed workloads which all impact on LAN performance. To keep up with new technology advancements, organisations need to gain a better understanding into network behaviour to optimise the LAN and minimise performance bottlenecks. As wired and wireless network systems integration can deliver best-in-class LAN connectivity solutions to both Service Provider and Enterprise customers. A better in-house designing, installing and configuring of the network infrastructure can be successfully integrate and fully scalable LAN technologies from routing and switching through to Ethernet and VLANs, as well as supplying and supporting the core network hardware.



*Figure 7. A Case study Design of LANs (wired and wireless network)*



To Summarized, the use of ICT is assumed to change three coordination structure aspects: a more centralized structure is expected in which more organizations participate and in which agreements are settled for a shorter period of time. Therefore, use of ICT will provide the possibility to change the coordination structure to a more market-like structure. In the expectations ventilated above ICT is considered to be the driving force. There are, however, other aspects that have an influencing impact on intra-organizational coordination. The slide presentation of our intra-organizational information system that we design with a level of activities involved.

*Figure 8. Prototype of the Information system*

### **Conclusion and Further Research**

The impact of ICT on intra-organizational coordination has been explicated by designing some guidelines for coordination structures. Based on application of the guidelines, they should be evaluated. For a thorough evaluation of the designed guidelines for intra-

organizational coordination, they should be applied to various application areas, such as the transport industry, the production industry, and the service industry. Another interesting research area to further explore would concern the actual change in the coordination structure. With the guidelines given in this paper, a prediction of a coordination structure can be given. But as said earlier, a coordination structure cannot be prescribed, but has to evolve over time. Further research could focus on the question how this process of change takes place and how one can intervene in this process, if possible at all. Furthermore, the focus of this paper was on intra-organizational coordination structures. Coordination processes were left aside, but ICT could have a tremendous impact on the processes as well. Much research is already taking place on this subject, but interesting to see is how this would combine with the research described in this paper.

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