ELECTRONIC MULTI-AGENCY COLLABORATION

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ELECTRONIC MULTI-AGENCY COLLABORATION

A Model for Sharing Children's Personal Information Among Organisations

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ABSTRACT

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Electronic Multi-Agency Collaboration:
A Model for Sharing Children's Personal Information
Among Organisations

Keywords: Confidentiality, Information Sharing, Multi-Agency Working, Social Services, Vulnerable Children

The sharing of personal information among health and social service organisations is a complex issue and problematic process in present-day England. Organisations which provide services to children face enormous challenges on many fronts. Internal ways of working, evolving best practice, data protection applications, government mandates and new government agencies, rapid changes in technology, and increasing costs are but a few of the challenges with which organisations must contend in order to provide services to children while keeping in step with change.

This thesis is an exploration into the process of sharing personal information in the context of public sector reforms. Because there is an increasing emphasis of multi-agency collaboration, this thesis examines the information sharing processes both within and among organisations, particularly those providing services to children. From the broad principles which comprise a socio-technical approach of information sharing, distinct critical factors for successful information sharing and best practices are identified. These critical success factors are then used to evaluate the emerging national database, ContactPoint, highlighting particular areas of concern. In addition, data protection and related issues in the information sharing process are addressed.

It is argued that one of the main factors which would support effective information sharing is to add a timeline to the life of a dataset containing personal information, after which the shared information would dissolve. Therefore, this thesis introduces Dynamic Multi-Agency Collaboration (DMAC), a theoretical model of effective information sharing using a limited-life dataset. The limited life of the DMAC dataset gives more control to information providers, encouraging effective information sharing within the parameters of the Data Protection Act 1998.

Contents

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DEDICATION

Seldom does any period of time pass when one is not aware of life events, and these years of research are no exception. This thesis is dedicated

To the memory of …

Steven “Jay” Lows (12 Sep 1951 -- 6 Dec 2006)

Herman Lows (15 Feb 1925 -- 13 April 2008)

And remembered with celebration during the writing of this thesis …

Dean and Cicely Wiers-Windemuller (19 April 2008)

Nash River Wiers-Windemuller (b 26 October 2010)

Ethan and Jackie Wiers (11 October 2008)

Henry Clyde Wiers (b 12 October 2011)

LIST OF TABLES AND FIGURES

Tables

Figures

ACRONYMS

ADCS	Association of Directors of Children's Services
BPR	Business Process Reengineering
CAF	Children's Assessment Framework
CCR	Continuity of Care Record
CPOE	Computerised Physician Order Entry
CSF	Critical Success Factor
DCSF	Department for Children, Schools and Families
DMAC	Dynamic Multi-Agency Collaboration
DH	Department of Health
DPA	Data Protection Act 1998
eCAF	Electronic Children's Assessment Framework
ECHR	European Convention on Human Rights
ECM	Every Child Matters
EHR	Electronic Health Record
EMR	Electronic Medical Record
EPR	Electronic Patient Record
ER	Electronic Record
ESCR	Electronic Social Care Record
EU	European Union
FIPR	Foundation for Information Policy Research
GUI	Graphical User Interface
HMIS	Health Management Information System (Tanzania)
ICO	Information Commissioner's Office
ICS	Integrated Children's Service
IOS	Inter-Organisational Information System(s)
IS	Information System(s)
ISP	Information Sharing Protocol
IT	Information Technology
LA	Local Authority
NDF	National Drug File
NHS	National Health Service
PCG	Primary Care Group
PCHR	Personally Controlled Health Record
PCT	Primary Care Trust
PHR	Personal Health Record
QC	Queen's Counsel
RDV	Remote Data View
SCR	Summary Care Record
ST	Socio-Technical
UK	United Kingdom
UN	United Nations
USA	United States of America
VA	Department of Veterans Affairs (United States)

Chapter One: Introduction

1.1 INTRODUCTION

It is axiomatic in that in twenty-first century England keeping children safe is a priority of our health, social, educational, and judicial systems and that effective models for sharing children's personal information can be seen as of crucial importance in the field of child protection and safeguarding.

The aim of this thesis is to examine the information sharing process among children's service organisations, particularly in health and social care, and to evaluate the emerging national database. At the time of this writing, ContactPoint is presented by its advocates as being central to the positive development of Integrated Children's System (ICS), the government's planned system for assisting children. Further, this thesis investigates whether there are any improvements that can be made in the information sharing process, and proposes a dynamic model of sharing children's personal information.

Consisting of two parts, part one of this thesis introduces the principles of socio-technical (ST) design, an empirical evidence approach, which examines the information sharing system via its interrelated social and technical elements. The ST perspective, although not always so labelled, asserts that humans are assets and that technology is a tool to support humans in meeting their goals. Part one continues by applying the ST approach to the emerging national database, ContactPoint, and evaluates ContactPoint's system design, identifying problematic areas.

Part two addresses a specific area of information sharing among children's service organisations, that of data protection and the repercussions of data protection legislation. Data protection is a key area which remains a challenge to effective information sharing among children's service organisations. Additionally, part two introduces a theoretical model for information sharing, Dynamic Multi-Agency Collaboration (DMAC). DMAC is regarded as an integral part of a ST information sharing system, taking into account ST principles, upholding data protection mandates, and streamlining information flow when sharing personal information. The feature which sets DMAC apart from other information sharing methods, however, is the creation of a timeline which underpins the information sharing process and creates a temporary dataset which dissolves at the appropriate time, leaving behind no permanent record.

In January 2003, Lord W. Herbert Laming submitted a report to Parliament following his inquiry into the tragic death of nine-year old Victoria Climbié, a child who was grossly abused and murdered by her aunt and aunt's partner (Laming, 2003). The report examined the circumstances around her death, and the involvement of various organisations and professionals with her and her carers prior to her death. The Inquiry also involved organisations such as churches, and people such as pastors who were "involved" in significant ways (e.g. encouraging ideas about "possession") but did not "work with" Victoria and her carers in the same sense as doctors or social workers (Gilligan, 2009).

Arising from issues identified in the inquiry, Lord Laming outlined 108 recommendations aimed at preventing such an event from occurring in the

future. These recommendations include better sharing of information among organisations; the necessity of professionals being prepared to question the opinion of their colleagues and being aware of whom to contact in other organisations in the event of child protection concerns; joint investigations by multiple organisations; other guidelines outlining the working together of the professionals working with children (Laming, 2003). In other words, among the recommendations listed, several concern information sharing, and the working together of different professionals and organisations. As well as Lord Laming's high profile report, other official reports have been published, such as the report by Sir Michael Bichard into the murder of two girls, Jessica Chapman and Holly Wells, by a school caretaker, Ian Huntley, who had been employed without the exchange of relevant information between police forces and the education authority (Bichard, 2004). Sir Michael's report lists recommendations in the areas of information technology, information management, protection of children and vulnerable adults, and enhanced vetting procedures (Bichard, 2004).

Emerging from these reports government initiatives have been introduced such as Children's Trusts, Children's Services Directorates, the Integrated Children's System and ContactPoint, the national directory designed to register all children in England up to age eighteen.

These events have already required significant changes within organisations, and will continue to do so. Government requirements, evolving technology, the desire for better patient/ client/ student care, evolving best practice, and more efficient systems have all contributed to the increasing use of technology in the

workplace (Tranberg & Rashbass, 2004; DH, 2006). Government policies have required new infrastructures for health, social care, education, and youth offending in addition to organisations' traditional and individual methods of processing information, and the electronic records systems and databases which hold personal information (Anderson et al., 2006; Parekh, 2007). Because of increasing technology and other factors in the workplace ways of working are in transition for many professionals (Mumford, 2003; Nicholls, 2004; Garfield, 2006). New ways of working within organisations, new guidelines, procedures and policy, the rise of technology, and budgetary concerns -- all have given rise to significant changes within organisations, producing tensions in attempts to manage change (Mumford, 2003; Wilson, 2006; Moore, 2007).

Organisations share personal information, amongst other things, in order to provide assistance to their clients and patients, a process which is increasingly complex and beset with difficulties, particularly when new technologies and data protection legislation can confuse the issues (Curry & Moore, 2003; Anderson et al., 2006; Garfield, 2006; Yang et al., 2006). Yet, studies suggest that in healthcare, social care, education, and other children's services electronic records are crucial for accessing and sharing information, and both the quality and effect of the offered services can be greatly increased (Brown et al., 2003; Tranberg & Rashbass, 2004; Anderson et al., 2006; Schabetsberger et al., 2006; Waegemann, 2008).

The sharing of personal information among children's service organisations is a complex and problematic process in present-day England. The assorted layers

of organisational divisions, departments, hierarchical structures, professional specialties, boards, committees, and teams which contribute to or coordinate information sharing can become barriers to sharing information (Curry & Moore, 2003; Anderson et al., 2006; Garfield, 2006; Wilson, 2006). Lack of clarity around best practice, rapidly-changing technology and general cost increases complicate the issue. Typically, technology is hailed as the necessary solution; however, many health and social service agencies report additional problems with these technological "solutions" (Clegg, 2000; Munro, 2005; Bell et al., 2008).

Organisations providing services to children face many challenges, not the least of which is the maintenance of accurate personal information on the children they serve and the development of appropriate protocols for sharing that personal information with other organisations. In any organisation, information is gathered and stored for various agency-specific purposes. Such data is subject to best practice and data protection principles which do not necessarily include the best methods for information sharing. When, in December of 2005, the government announced that a national children's database would be created, organisations found it necessary to address the myriad of interconnecting challenges in maintaining and sharing information.

Technology with all of its applications remains a particular area of ongoing concern for organisations. "The expansion of electronic information services within the National Health Service (NHS) and with its other information partners has reinforced the need for effective security and confidentiality arrangements

to apply at multiple levels and in a variety of different business contexts. Added to these, the need exists to consistently address issues of data protection, records management and data quality" (Donaldson & Walker, 2004).

Organisations continue to be faced with implementation and maintenance issues involving hardware and software as the shift from paper to electronic records continues. Professionals disagree on many issues, including levels of access to records and databases, security, privacy, confidentiality, integrity of records, and accountability of those accessing records; all these and related areas need to be carefully considered. Organisations themselves continue to develop and change often whilst suffering decreasing funding. Tough demands are made of them in terms of the staffing, training, and operation of records management with new electronic systems.

Traditionally, each organisation collects necessary data on each client or patient and maintains its own "silo" of information. Practitioners are called upon to handle and share personal information, possibly of great sensitivity, and to make decisions which, at the extreme, can determine whether an individual lives or dies (Bellamy et al., 2005). Data protection and privacy issues are at the heart of the reluctance and anxiety about information sharing in many organisations, which results in information sharing being a time-intensive process.

There are many problematic areas facing health and social care organisations which provide services for children and their implications are far-reaching

(Anderson et al., 2006). It is beyond the scope of this thesis to examine in detail all the infrastructures, systems and processes involved in sharing children's personal information among all the organisations, agencies, health services, educational institutions and police constabularies. Neither is this thesis a comprehensive analysis of the government's emerging children's system. This thesis is offered as an overview and an introduction to evaluating multi-agency information sharing from an integrated perspective, considering both the social and the technical aspects of information sharing.

1.2 RESEARCH PROBLEM

The following areas are addressed in this thesis:

1. ContactPoint Design. ContactPoint and the Integrated Children's System are the government's solution to ineffective information sharing between children's service organisations. This study evaluates ContactPoint design and the government's claims that it will solve the problems of information sharing. The framework of this evaluation is the ST perspective, the design elements of which are addressed in chapter three.
2. Problematic areas of professional concern. Continual issues arise surrounding the use of ContactPoint, the ICS and other multi-agency procedures issued by the government. In addition, problematic areas of professional concern continue to emerge; these are also addressed in chapter three.
3. Data Protection and other barriers to information sharing. Data protection is a unique area in sharing personal information among children's service

organisations. Problems can result from attempting to implement data protection requirements and intra-agency protocols protecting confidentiality while, at the same time, sharing personal information. Problematic areas regarding data protection and sharing personal information are addressed in chapter four.

4. Dynamic Multi-Agency Collaboration (DMAC). DMAC is offered as a solution to the thorny issue of protecting data and maintaining confidentiality while sharing information. DMAC encourages information sharing because it is underpinned by a timeline and dissolving dataset. These uphold data protection requirements and organisational protocols while sharing information in real time. DMAC is explained in chapter five.

1.3 RESEARCH MOTIVATIONS

There is much controversy surrounding the government's approach to information sharing via the construction of a national children's database, ContactPoint, and the Integrated Children's System (ICS); areas of concern include the £224m construction cost, issues of design, risk, technology and changes to ways of working (Munro, 2005; Wilson, 2006; Bell et al., 2008; Peckover et al., 2009).

Discussion of issues and expression of opinions are vital for those involved in the information sharing process and the general public. Ideas expressed, however, must be validated in order to gain merit and acceptance. This necessity for validation is the first reason why the author has embarked upon

the present empirical investigation, and chosen to explore proven criteria for successful information sharing among organisations.

Secondly, many writers are concerned about the £224m cost of constructing the national directory, ContactPoint (Elliott, 2007; Davies, 2008; Murray, 2008; Pierce, 2008). According to Every Child Matters (ECM), Department for Children, Schools and Families, the ContactPoint database will facilitate more integrated working among organisations, and facilitate information sharing (ECM, 2007c). However, the author was interested in discovering what the empirical evidence has shown – whether or not constructing and maintaining an extensive database is advisable or necessary as an integral part of successful regional or national information sharing system.

Thirdly, in order to assist in information sharing practices, organisations have put into place a number of new procedures -- best practice, guidelines, flowcharts, new software, etc with often contended and sometimes very unsatisfactory results (Broadhurst et al., 2009). In the year 2000, the child Victoria Climbié was tragically abused and murdered by her carers resulting in the Laming Inquiry and Report of 2003. In the year 2008, in the same London borough, the mother of "Baby P" and her partner were convicted of Baby P's murder. This household had been in contact with both health and social care agencies which had implemented many of the Laming Report's new policies and procedures in the years prior to Baby P's murder (Guardian, 2008).

It is unrealistic to expect an information sharing system of any kind to keep all children safe all the time. The author, however, desired to discover what protocols and applications organisations need to have in place for more effective information sharing as well as the necessary elements of information system design. The author desired to focus on the system of information sharing based on empirical evidence in order to identify critical factors for information sharing success in most circumstances.

1.4 AIMS AND OBJECTIVES

The aim of this exploratory research is twofold. Firstly, it examines the fundamental issue of information sharing, the components which are involved, and the ST factors and Critical Success Factors (CSFs) which are necessary for a successful information sharing collaboration. This research next applies these components to the evaluation of the ContactPoint database.

Thirdly, this thesis proposes Dynamic Multi-Agency Collaboration (DMAC), a part of a ST information sharing system which addresses the problematic area of data protection, and offers an essential solution and step forward in multi-agency working.

This thesis aims at exploring the following research questions:

1. What factors are critical for the successful computer-based information sharing of children's personal information?

2. What are the barriers which arise from the special issues in sharing children's personal information?
3. Is there an information sharing model which incorporates the critical factors for information sharing success, and also acknowledges and successfully manages the obstacles to information sharing?

1.5 JUSTIFICATION AND CONTRIBUTION

In order to undertake an empirical evaluation of ContactPoint and relevant aspects of the ICS, a ST approach is both necessary and fundamental, as any serious assessment or examination cannot be based on opinion, public reaction, or the popular press.

Firstly, in considering information sharing systems, data protection, and keeping children's personal information safe, there are several important research contributions made by this study. In taking a ST approach to its investigation of the information sharing process, this study looks through the lens of what has been empirically proven to be successful, with the overall goal of keeping children's personal information safe. It recognises that the process of electronic data sharing, sometimes referred to as "database linkage", "information exchange", "joined-up records", or in other terminology, is a complex issue with many "moving parts" or requirements (Lu et al., 2006; Waegemann, 2007; Wilson, 2006). It notes that much has been written about specific aspects of electronic records, information sharing, protecting children, and data protection

involved in the whole system (Anderson et al., 2006) and seeks to add to this literature.

Secondly, the process of holding personal information in databases and sharing this information is now a global issue. Most developed countries are building electronic information sharing systems within the contexts of their own data protection laws (Anderson et al., 2006; DeBor et al., 2006). Even developing nations are implementing electronic medical systems with the continued goal of collaboration and data sharing (Clifford et al., 2008). In present-day England, the Department for Children, Schools and Families (DCSF) is strategically planning for increasingly integrated working in delivering co-coordinating services locally and nationally (ECM, 2008a, 2008c). By identifying critical factors for successful information sharing, the methodology discussed in this research will be of interest, highly relevant, and applicable to many types of information sharing systems nationally and internationally.

Thirdly, the sheer mass of information to be shared is continually expanding. "With the development of more integrated services, and the increasing introduction of electronic systems, the range of information that may need to be shared on a regular basis is increasing. A wider range of organisations are becoming involved, and public sector customers have expectations of more seamless service" (Grayson et al., 2005). Empirical investigation into the process of information sharing and introducing better ways of organisational collaboration is vital at this moment in time.

Fourthly, the Data Protection Act 1998 has specified that certain precautions must be taken when sharing information, but it does not resolve all the relevant issues (Tranberg & Rashbass, 2004). Much confusion exists about the when, why and how of actually sharing personal information in a way that will uphold data protection principles (Anderson et al., 2006; DH, 2006). This thesis explores these issues, especially as they relate to databases about children. Particularly now that a great deal of children's personal information is held on databases, and shared with a variety of professionals, it is imperative that a clear process for information sharing is available.

Finally, this thesis proposes a theoretical model of electronic information sharing, i.e., DMAC. It is understood that best practice on information sharing, guidelines and other helps for various institutions and organisations are widely available. However, as Kesteven & Spurgeon (2004) state, "There is no shortage of guidance on information sharing but this does not seem to have made it easier to negotiate the pitfalls when, on the one hand, organisations are required to observe an individual's right to confidentiality and, on the other hand, they may be required to disclose information in the public interest" (Kesteven & Spurgeon, 2004). DMAC negotiates ways through these pitfalls to deliver a clear and robust solution to data protection in information sharing among children's service organisations. DMAC, part of a ST design for successful information sharing systems, upholds data protection principles and delivers a straightforward method of electronic information sharing which can protect children's personal information.

1.6 DESIGN/ METHODOLOGY/ APPROACH

This thesis consists of identifying the components which contribute toward an effective information sharing system among organisations, with an evaluation of the emerging database ContactPoint. There follows a description of problematic areas which hinder successful information sharing including problematic areas of data protection and maintaining confidentiality. Finally, a theoretical model of electronic information sharing is presented which streamlines the information sharing process and particularly addresses issues of data protection and confidentiality.

This thesis evaluates present-day information sharing from a ST approach. In particular, the design of ContactPoint, the emerging national children's database, and the ICS are described and evaluated according to ST principles. Additionally, this thesis provides an overview of the data protection issues in the sharing of personal information about children. It is on this foundation that DMAC is introduced, part of a ST approach to addressing the process of electronic information sharing among children's service organisations. Additionally, external validation for the DMAC model is sought, that it will live up to its claims of facilitating information sharing.

The author has sought to consider universal ST principles of successful information sharing. The scope of this thesis is both international, outlining universal principles for information sharing among complex organisations, and national, considering England at the beginning of the twenty-first century. This

thesis does not aim to deliver an exhaustive discussion of information sharing or to take any particular position regarding current political controversies. Rather, it is a beginning point for debate and further research on effective information sharing among organisations which provide children's services.

1.7 THESIS OUTLINE

This thesis is an investigation of the process of sharing personal information in the context of public sector reforms, which put an increasing emphasis on multi-agency collaboration. This investigation is not exhaustive, but rather exploratory in nature. A brief explanation of each chapter follows below.

Chapter One - Introduction

Chapter one provides the background to the problematic area of sharing personal information among children's service organisations. There follows the researcher's overview of the study, including the research problem, motivations, aims, objectives, justification, contribution, design, methodology and approach.

Chapter Two – Review of the Literature

Chapter two supplies a literature review regarding information sharing elements.

- Information sharing is a complex and diverse issue. Some representative perspectives used to consider complexity and diversity are outlined.

- Terminology. For clarification, some of the general terminology used is included here.
- The UK Policy Context.
- The socio-technical (ST) approach to Information Systems (IS).
- Inter-Organisational Information Systems (IOS) in historical perspective.
- Critical Success Factors (CSFs): socio-technical (ST) application to the Inter-Organisational Information Systems (IOS).
- Frameworks for information sharing.
- Case studies.
- Why people do not share.
- Data Protection.

Chapter Three – Effective information sharing

Chapter three identifies "best practices" in information sharing and considers the importance of a socio-technical (ST) approach in Information System (IS) design. Seven Critical Success Factors (CSFs) necessary for Inter-Organisational Information System (IOS) success are outlined and the national database, ContactPoint, is then evaluated according to ST principles.

Chapter Four – Barriers to effective information sharing

Chapter four describes the barriers to information sharing, including the challenges surrounding data protection. Timeliness and lack of an information

sharing framework are also identified as obstacles to effective information sharing.

Chapter Five – Dynamic Multi-Agency Collaboration (DMAC)

Chapter five presents the socio-technical model, Dynamic Multi-Agency Collaboration (DMAC). One of the main factors which supports data sharing is the timeline which underpins the DMAC dataset. The temporary DMAC dataset dissolves after a certain period of time and neither a database nor any permanent records are created in the process. The fact that the DMAC dataset has a preset limited lifespan gives more control to data providers who would be more inclined to readily share information through the DMAC model.

Chapter Six –The interview study

Chapter six appraises the DMAC model by external validation via an interview study of local IT specialists involved in information sharing.

Chapter Seven – Conclusion

Limitations of this thesis as a whole are next presented, followed by discussion and further research needed in this area, and finally conclusions which may be drawn from this study.

1.8 CONCLUSION

The sharing of children's personal information among organisations is a multi-faceted process with many components. Issues arising from data protection, technology, ways of working, information culture, tradition, legislation and governance all converge when considering how to keep children safe. Sharing children's personal information among organisations is necessary at times to assist in the process of keeping children safe.

For effective information sharing, i.e., sharing personal information among children's service organisations, a ST approach is essential. This thesis asserts that empirical evidence establishes the fact that that without a foundation in ST principles an information sharing system will not be effective.

This research examines the special requirements necessary for information to be shared successfully -- effectively, seamlessly, productively -- and then introduces a model for successful sharing.

The study now begins by reviewing the literature surrounding personal information sharing.

Chapter Two: Review of the Literature

2.1 INTRODUCTION

In twenty-first century England, collaboration among organisations and sharing children's personal information is an issue often in the news.

At the time of this writing, the Department for Children, Schools and Families (DCSF) is advancing Every Child Matters (ECM), "a shared programme of change to improve outcomes for all children and young people. It takes forward the government's vision of radical reform for children, young people and families" (ECM, 2009a). ContactPoint is the national database now in the implementation stage, and is designed to hold information on all children in England up to age 18. It "is a key element of the Every Child Matters (ECM) programme to transform children's services by supporting more effective prevention and early intervention" (ECM, 2008a).

Unconditional acceptance of a national children's database, however, does not characterise the response of the general public or of many delivering social services to children. Skepticism about the government's ability to construct large Information Technology (IT) projects, lack of financial justification for mammoth databases, distrust of the government's intentions, general suspicion of technology, outcries following recent security breaches, continuing concerns with privacy issues – are all topics of intense interest. Both the general public and practitioners whose jobs are already affected are keeping close watch on developments in these areas.

In addition to local and national concerns, electronic information sharing has increasingly become an area of global concern, and studies continue to be published worldwide describing Information Systems (IS) in developed and developing nations, the motivation for implementing electronic information systems, the design type, and the people, tasks and technology involved.

This chapter gives a review of the relevant literature concerned with the complex information sharing process and organises the review into ten elements. Within these elements, best practice and Critical Success Factors (CSFs), critical factors for information sharing effectiveness, form the framework of this thesis. CSFs through a socio-technical (ST) approach set the stage for Dynamic Multi-Agency Collaboration (DMAC), a theoretical model which resolves problematic issues in sharing children's information; dimensions of DMAC are given in each chapter as appropriate with DMAC fully discussed in chapter five.

This discussion now turns to the ten elements in the information sharing process.

2.2 ELEMENTS IN THE INFORMATON SHARING PROCESS

2.2.1 Electronic information sharing from diverse perspectives

The sharing of personal information electronically can be viewed from a variety of perspectives, owing to the complexity of the processes, organisational history and development, and both the social and the technical elements involved.

Waegemann (2007) of the former Medical Records Institute (USA) lists twelve functional requirements necessary for the Electronic Health Record (EHR):

1. Security. End-to-end security from point of origin to point of access; backup and recovery with emergency mode operations; user identification and authentication; access control, encryption, data stores, data / function classifications, and user / role clearances; data integrity and non-repudiation; signature architecture.
2. Clinical Practice. Standards of care / practice, protocols (e.g., care plans, critical paths), problem managements and resolutions.
3. Decision Support. Standards for clinical decision-making, algorithms, triggers, responses, logical support, etc.
4. Operational Dimension. Practitioners, actions, process states / state transitions, work flows, allocation, deployment, staging, and routing.
5. Content. Scope of health information (limited to department or to one provider), scope of completeness of information.
6. Quality Assurance and Testing. Systems' testing and operational quality assurance.
7. Performance. Standards and measures of performance.
8. Data Model. Classes, relationships, attributes, states, identifiers, data types, and version control.
9. Interoperability. Common (inside systems) convergence EHR domain, (outside) disparate domain, data and functional mapping, translation rules, versioning, and audit.

10. Information Capture. Voice, handwriting, direct input, document imaging, email, etc.
11. Information Representation. Terminology, code sets, languages, etc.
12. Confidentiality. Chain of trust in the end-to-end information flow from point of origin to point of access; stewardship and accountability encompassing organisations, business units and individuals; trusted communications (Waegemann, 2007).

Brown et al. (2003), of the Department of Veterans Affairs and Vanderbilt University (USA) along with his colleagues, lists ninety-nine applications necessary for a national-scale health information system grouped according to three types of applications (see Appendix A for complete applications list):

1. Infrastructure Applications.
2. Administrative and Financial Applications.
3. Clinical Applications (Brown et al., 2003).

Focusing on the needs of cross-organisation collaboration in twenty-first century England, Ron Wilson (2006), Centre for Social and Business Informatics, Newcastle University, observes multiple contexts in delivering integrated services for health and social care:

1. A user (patient/ carer/ household) perspective, often expressed in terms of the need of a more joined-up approach such as a single assessment process.

2. A process of integration such as those based on a common workflow.
3. A practice/ practitioner perspective, based on a common understanding of "the problem."
4. A policy perspective, such as exemplified in joint or common policy statements or cross referencing.
5. A commissioning or procurement notion of integration, as exemplified in joint budgeting, funding and commissioning.
6. A managerial notion of integration, as expressed as planning, monitoring, evaluation and activity.
7. A technical notion (Wilson, 2006).

The above perspectives illustrate just a few of the diverse views and approaches to the issue of information sharing and also the complexity of the issue.

2.2.2 General terminology

As illustrated above, information sharing is a complex and multi-faceted issue containing many components, and sharing information electronically increases its complexity (Mumford, 2003; Lu et al., 2006; Peckover et al., 2009).

Throughout this thesis, the term information sharing is used in the context of sharing personal information which is held on a record in an organisation's information system. Also, for the purposes of this thesis, the terms "data" and

"information" will be used interchangeably. The following discussion describes the terms used in this thesis.

The Department of Health, in *Making a Difference*, defines health data or health information to include all factual information that can be used to support the delivery of patient care (DH, 2006).

Personal information is a special type of information and is described by the Information Commissioner's Office (ICO) as follows:

1. If a person can be identified from the data, or from the data plus other information held.
2. If the data relates to an identifiable living individual, whether in personal or family life, business or profession.
3. If the data is "obviously about" a particular individual.
4. If the data is linked to an individual so that it provides particular information about that individual.
5. If the data is used or to be used in order to inform or influence actions or decisions affecting an identifiable individual.
6. If the data has any biographical significance in relation to the individual.
7. If the data focuses or concentrates on the individual as its central theme rather than on some other person, or some object, transaction or event.
8. If the data impacts or has the potential to impact on an individual, whether in a personal, family, business or professional capacity (ICO, 2008a).

As might be expected, the term "personal information" or "personal data" is not uniformly defined among organisations which process personal information (Booth et al., 2004). For example, personal information can include such items as a person's National Health Service (NHS) number because, although it does not in itself reveal an identity, the NHS number in conjunction with other information can identify a person to the user accessing the information (Tranberg & Rashbass, 2004). The data controller is the person in the organisation who makes the decisions regarding the processing of personal information for that organisation. Information sharing is included in the term "processing" which refers to obtaining, recording, storing, disclosing, destroying or carrying out any operation or set of operations on the personal information (ICO, 2009; IMPS, 2009).

For the most part, this thesis refers to "agencies" and "organisations" interchangeably, recognising that an agency may generally be considered as "an organisation, company, or bureau that provides some service" while an organisation might be more generally thought of as "a group of persons organized for some end or work" (RH, 2009a, 2009b).

There are different types of electronic records contained in an organisation's information system; they vary by organisation, country and accepted use and function. This thesis uses the more generic term "Electronic Record" (ER), as an ER is the basic unit for social care, health, education, youth justice and other

related sectors and groups. Some common types of ERs in health and social care include:

Continuity of Care Record (CCR) – The CCR is designed to be a core data set of information concerning a patient. Its intent is to facilitate the communication of clinical information between different healthcare entities (Hieb, 2004).

Electronic Common Assessment Framework (eCAF) – The eCAF is a central feature of the Every Child Matters agenda. It is a personal assessment tool that facilitates information-sharing by introducing a standardised set of assessment criteria for use by multiple organisations. eCAF will, like ContactPoint, be a national government database (ECM, 2007c).

Electronic Health Record (EHR) -- (USA) An electronic record of health-related information on an individual that conforms to nationally recognised interoperability standards and that can be created, managed, and consulted by authorised clinicians and staff across more than one health care organisation (NAHIT, 2008).

Electronic Medical Record (EMR) – An electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorised clinicians and staff within one health care organisation (NAHIT, 2008).

Electronic Patient Record (EPR) – A computer-based health record accessible by health professionals on any networked computer in the NHS (Greenhalgh et al., 2008). The multi-faceted nature of an EPR contains information of different types such as a patient's healthcare history, consultation results, lab reports, pharmacy information, progress notes, reports from various tests such as an echocardiogram, etc (Brown et al., 2003; Cannataro et al., 2008).

Electronic Social Care Record (ESCR) -- The fundamental ER for national social care, the ESCR brings together all relevant information for a social care user in one place. It includes structured information, unstructured information and coded data which is mainly for management and statistical reports (DH, 2003).

Personal Health Record (PHR) – An electronic record of health-related information on an individual that confirms to nationally recognised interoperability standards and that can be drawn from multiple sources while being managed, shared, and controlled by the individual (NAHIT, 2008); sometimes referred to as a Personally Controlled Health Record (PCHR) (Halamka et al., 2005).

Summary Care Record (SCR) – The Summary Care Record (SCR) is a centrally stored summary of key medical details that is created from a person's existing NHS record (initially, the one held by their GP) and made available to NHS staff in emergency and unscheduled care situations (A&E departments, GP out-of-hours clinics, and walk-in centres). It is comparable to (but differs in

important respects from) the Emergency Care Summary in Scotland and the Individual Health Record in Wales. It will initially contain details of medication, allergies and adverse reactions (Greenhalgh et al., 2008).

2.2.3 UK Policy context

The roots of state assistance for those in need can be traced back to The Poor Law Act of 1601, a breakthrough in existing social policy which created a framework of help for the poor, and where the local authorities made apprentices of all children whose parents were not "in the opinion of the council, able to keep and maintain their children" (Poor Law, 1601). With the Children Act 1948 great progress was made on the part of caring for children in need and obligated the local authority to further the individual child's best interests. The children who were orphans, who had been deserted by their parents, or who had parents who were unable or unwilling to care for them were to be given every opportunity for the development of their character and abilities (Fawcett et al., 2004; Frost & Parton, 2009).

Following the Second World War, several key issues were prominent in policy formation. Even with the advanced status given to these children during the post-war period, children in general were largely neglected in developments of social policy (Fawcett et al., 2004). During the 1950s, however, children's departments began to feel the need to intervene earlier in some children's circumstances, so that children's services might be able to prevent these children coming later into care. Thus, services to the family became a more

established and accepted concept, leading to statutory power in children's services. As a consequence, children's services became more active in order to assist families in the community, with the hopes of preventing children coming into care later (Frost & Parton, 2009).

The Children Act 1989 became a significant milestone for child welfare as a major shift occurred in the understanding of the term *prevention* in child welfare. Originally the term *prevention* had to do with preventing children from coming into care, with the idea of protection when necessary. The new understanding of *prevention* carried with it the idea of family support, and promoting the care and upbringing of all children within their families (Frost & Parton, 2009). The implications of this shift in emphasis had, and continues to have, a potential for enormous consequences in social care. Preventing harm while protecting children in need may involve a relatively small number of children, as illustrated by the fact that there were 50,000 children on the child protection register in England in 2006 (Anderson et al., 2006). The new emphasis on family support, encompassing all children, seeking to maximise their opportunities, and provide positive outcomes for all, could involve three to four million children (Anderson et al., 2006; Frost & Parton, 2009).

During the early 1970s, besides the shift in the role of supporting children and families, other changes were taking place in children's services as well. "The role of the new social services departments was not just to provide a range of services and professional help, but to coordinate aspects of other state services, such as health, education, housing and social security, and thereby

make them more responsive to need…" (Frost & Parton, 2009). In addition, child protection became an area in the forefront when, in the period between 1974 and 1985, there were twenty-nine inquiries into deaths of children as a result of abuse. Partnership working among children's services and other agencies was now becoming a necessity, giving rise to social workers assisting families through case management, often involving other agencies in order to investigate abuse and provide other assistance (Frost & Parton, 2009; Ferguson, 2010). Caring for children in need had now developed to its use in the present context, that it is "no longer a bounded activity delivered by a single agency/ professional. It goes on through networks and flows of practices between organisations and service users, carers, the office and the home" (Ferguson, 2010).

This working together among organisations in health and social care has not been straightforward, however, especially in relation to provision for adults. A general gap has existed between health and social services which has continued from the post-war years to the present. This disparity may be attributed to three factors:

1. Financial. Health professionals providing services through hospital, rehabilitation, and community health services are funded through taxation and are often free at the point of delivery. Social care, however, has always been much more of a "mixed economy." Some have suggested that this funding separation, together with the fact that resources have often been severely

limited, that has above all encouraged both local authorities and health authorities to minimise their responsibilities.

2. Administrative. The administrative divide was created at the end of the Second World War. The 1948 National Assistance Act, the 1946 NHS Act, and the 1974 NHS reorganisation all illustrate the changing meanings of which services constitute health care and which services constitute social care; these and related definitions have shifted over time.

3. Professional divisions. Professional divisions and professional rivalries have always seemed the most obscure. The status of social work has been much lower than that of medicine. Having fought to free themselves of medical control within the local authorities, which they accomplished in the early 1970s, social workers have continued to be wary of the influence of "the medical model" and have promoted "social models" in fields such as disability (Glendinning, 1983, 2003; Lewis, 2001).

Successive initiatives since 1950 reflect continuing struggles over responsibilities, even though government had directed health and social care to more forward toward more cooperative working (Lewis, 2001). Government exhortations for joint working were largely unsuccessful due to differences in funding structures, planning cycles, decision-making processes, work cultures, geographical boundaries, and separate service planning. Further, many of these areas fomented mutual suspicion, and boundaries between health and social services remained firmly established (Lewis, 2001).

Although steps have been taken by the establishment of Primary Care Trusts (PCTs), by legislation such as the Health Act flexibilities, and by governments taking steps toward modernisation, problematic issues in partnership working remain. Despite various periods of attention, and despite the views of professionals and service users, there continues to be an uphill struggle to make children in need, children looked after, or children at risk a major policy area for PCTs (Marsh, 2006). For services to children, problems in partnership working between organisations have been particularly acute, particularly in the community-based health care of looked after children, children leaving care, and children at serious risk. Less attention has been given to developing policies for inter-professional work between primary care, general social work services, and children's services than that which has been given to services for older people which have been subject to regular policy development.

Ultimately, it is people, however, who provide human services, and they bring with them their own cultural, professional, and employment traditions to partnership working (Glendinning, 2003; Marsh, 2006). Examining partnership working, Marsh (2006) identifies distinctions in co-operative working between 1. Intra-professionalism within social work teams, where roles or expertise are different but a team share the same broad discipline base and 2. Inter-professionalism, where shared work crosses significant professional borders. Services for children and families face the dilemma of how intra-professional work is to be achieved. In addition, further distinctions of co-operative working must be examined, i.e., intra- and inter-professional policy, intra- and inter-professional practice and intra- and inter-professional education (Marsh, 2006).

2.2.4 The Socio-Technical (ST) approach to Information Systems (IS)

In order to empirically examine the process of sharing personal information among organisations, this thesis adopts a socio-technical (ST) approach. The ST perspective – which includes people, technology, and the tasks involved -- is necessary in order to adequately grasp the complexity and multi-faceted nature of information sharing, and the multiple perspectives from which electronic information sharing is viewed.

The history of ST design dates back to the post World War Two era to a group of mostly London therapists, researchers, psychiatrists, and consultants working with soldiers, and psychologically rehabilitating them in order to return to civilian life (Mumford, 2003). In ensuing years, this group of specialists came to believe their work was applicable to the organisation of work in industry. Two areas of ST application emerged: First was the need for work to become meaningful, intellectually stimulating, and fulfilling. Second was the idea of democracy at work, whereby employees influence the design of their own jobs and workplace (Mumford, 2003).

In 1976, Albert Cherns, in his landmark paper *The Principles of Sociotechnical Design,* crystalised then current ST thought and presented nine principles, labeling them Sociotechnical principles (Cherns, 1976). Designing a system, according to Cherns, depends upon the objectives of the system and the people and technology involved in the system. Realising that all organisational

systems are in effect socio-technical, Cherns nonetheless wanted to formalise universal concepts as he understood them. In addition, he intended the concepts he was introducing to be regarded as overall elements, avoiding the necessity of repeatedly constructing new systems but yet allowing for flexibility in meeting unique news of each new system design. Table II-1 summarises Cherns' original nine principles of socio-technical design.

	Principle	**Description**
ST1	Compatibility	Design with the objective in mind and the competencies required to meet them
ST2	Minimal Critical Specification	Identify the essential and do not specify more than is absolutely essential
ST3	The Sociotechnical Criterion	Variances are unprogrammed events; if they cannot be eliminated, control them as near to the point of origin as possible
ST4	The Multifunctional Principle: Organism vs Mechanism	Takes into account that the same function can be performed in different ways by using different combinations of elements, and equifinality, the principle that a given end state can be reached by many potential means
ST5	Boundary Location	"Frontline" members of an organisation co-ordinate and manage their own boundaries, or work areas, in their own departments as they are the ones who best know the work activities and what is required to successfully perform them; de-centralised control
ST6	Information Flow	Information systems should be designed to provide information initially to the point where it will be directly needed
ST7	Support Congruence	Systems of social support should be designed so as to reinforce the behaviors which the organisation structure desires
ST8	Design and Human Values	The design of the organisation should be to provide a high quality of work.

ST9	Incompletion	The multifunctional, multilevel, multidisciplinary team required for design is needed for its evaluation and review

Table II-1. Cherns' original nine principles of socio-technical design. *Adapted from Cherns, 1976.*

The ST approach considers both social and technical elements of design tasks, jobs, and work systems and elements of a ST system can be considered in a number of ways (Cherns, 1976, 1987; Clegg, 2000; Huff et al., 2005; Guzman & Trivelato, 2008). Included in ST design are inherent elements in the tasks, processes such as the perspectives, attitudes, values, knowledge, viewpoints and influence of the various stakeholders and the shared reality to which they subscribe (Hoffman, 2006; STFRG, 2004). Although these will be explained in greater detail in the next chapter, the seven overlapping dimensions identified in most ST systems are:

- Hardware. Mainframes, workstations, peripheral, connecting networks.
- Software. Operating systems, utilities, application programs, specialised code.
- Physical surroundings. Buildings, plan of room, physical aesthetics.
- People. Individuals, groups, roles (support, training, management, line personnel, engineer, etc), agencies.
- Procedures. Both official and actual, management models, reporting relationships, documentation requirements, data flow, rules & norms.
- Laws and regulations. Types of procedures, including those which carry special societal sanctions if the violators are caught.

- Data and data structure. What data are collected, how they are archived, to whom they are made available, and the formats in which they are stored (Huff et al., 2005).

2.2.5 Inter-Organisational Information Systems (IOS) in historical perspective

An Inter-Organisational Information System (IOS) within the business environment may be defined as an Information System (IS) which enables "the exchange of products, services and information between firms" (Han et al., 2008) or an automated IS "shared by two or more organisations, and designed to link business processes" (Robey et al., 2008).

In current use, an IOS is typified by three general characteristics: 1. An IOS provides shared information resources such as common databases, communication networks, or common applications. 2. An IOS supports partners in a network collaboration, usually by exchanging both structured and unstructured information. 3. An IOS provides a facility for continued collaboration and conflict management (Robey et al., 2008; Han et al., 2008; Chituc et al., 2009).

Research in IOS began in 1982 with Barrett & Konsynski publishing their pivotal paper, *Inter-Organisation Information Sharing Systems*. In this seminal research, Barrett & Konsynski discuss the levels of information sharing between

partners, as well as the cost commitment, responsibility, complexity, and organisational impacts (Barrett & Konsynski, 1982).

In ensuing years, particular IOS technologies have emerged and their use documented, such as Collaborative Planning, Forecasting, and Replenishment (CPFR), Electronic Data Interchange (EDI), or Radio Frequency Identification (RFI) (Attaran & Attaran, 2007; Grover & Saeed, 2007; Mossinkoff & Stockert, 2008; Ali et al., 2009). However, it was in the 1990s in which IOS achieved distinction as a significant application of Information Technology (IT) (Robey et al., 2008).

Theoretical development in IOS has proceeded concurrently alongside research into separate technologies resulting in a wide body of knowledge and theoretical diversity. Theoretical knowledge includes many theories explaining different parts of the IOS phenomena. Three significant strands of IOS knowledge emerge: 1. Adoption studies, including deployment and diffusion 2. Interfirm governance, including social and behavioural governance 3. Consequences of IOS, including integration, assimilation, and use (Grover & Saeed, 2007; Robey et al., 2008).

Within adoption, socio-technical (ST) aspects of IOS have also been widely examined. Robey et al. identify eight adoption factors which organisations need to address: the external environment, organisational readiness, innovation characteristics, perceived benefits, transaction characteristics, resource dependence, network externalities, and culture and institutional forces such as

the importance building inter-organisational trust in partner relationships and cultural biases (Robey et al., 2008).

Interoperability has also emerged as a pivotal factor of IOS due to the fact that interoperability has been perceived in multiple ways and a general lack of clarity exists in defining collaborative systems (Grover & Saeed, 2007). Table II-2 illustrates the four levels of sophistication and standardisation identified by Sprivulis et al. (2007) in health information exchange interoperability (Sprivulis et al., 2007).

Level	Interoperability	Definition	Example
Level 1	Non-electronic data	Minimal use of IT to share information	Mail, telephone
Level 2	Machine transportable data	Transmission of non-standardised information via basic IT; information within the document cannot be electronically manipulated	Fax or exchange of documents in other image formats such as scanned documents transmitted as portable document format files
Level 3	Machine organisable data	Transmission of structured messages containing non-standardised data; requires interfaces to translate data from the sending organisation's vocabulary to the receiving organisation's vocabulary	Email of free text; exchange of files in incompatible/proprietary file formats
Level 4	Machine interpretable data	Transmission of structured messages containing standardised and coded data; systems exchange information using the same formats and vocabularies	Automated exchange of coded results from external laboratories into an electronic medical record, automated exchange of the patients "active problem" lists between providers

Table II-2. Sprivulis et al.'s four levels of interoperability (Sprivulis et al., 2007).

Further to Spirvulis et al., Chituc et al. (2009) identify twenty-two criteria for collaborative interoperability including description, publication, identification of potential business partner or opportunity, messaging, inter-organisational collaborations, negotiations and agreements, semantics, information management, conflict solving, rights and obligations, roles and tasks fulfilment, learning, performance assessment, technical specifications, comprehensibility, generality, targeted enterprises, maturity, policy, accessibility, tools support, and ICT platforms (Chituc et al., 2009).

Glendinning (2003), in referring to collaborative working and integration of services, identifies a continuum, which extends from the complete separation and autonomy of organisations and functions, through encounter-communication-collaboration, to the quite possibly the highest level of integration, where separate organisations see their separate identities as no longer significant (Glendinning, 2003).

In addition to the degree of integration, Glendinning suggests horizontal levels at which integration can take place between organisations; these levels are illustrated in Table II-3.

Level	Description
Macro-level	Levels of government where significant decisions about resource allocation and investment are made, such as national ministries, state ministries, or county-level strategic planning level
Meso-level	Level at which operational management of local service units or frontline teams takes place

Level of individual service users	Level which coordinates diverse elements of different services for individual, such as case management

Table II-3. Horizontal levels of integration between organisations (Glendinning, 2003).

2.2.6 Critical Success Factors (CSFs): Socio-Technical (ST) application to Inter-Organisational Information Systems (IOS)

There are arguably many definitions of success and methods for measuring success. DeLone & McLean (2003), in *The DeLone and McLean Model for Information Systems Success*, use the terms "effectiveness" and "value" to characterise success (DeLone & McLean, 2003). Especially noteworthy is the fact that they include such items as "system use" and "user satisfaction" as measures of success.

DeLone & McLean (2003) define success in e-commerce via the set of defined metrics of quality, use, and benefits. These metrics are listed in Table II-4.

Quality and Use	**Benefits**
Systems quality	Adaptability Availability Reliability Response time Usability
Information quality	Completeness Ease of understanding Personalisation Relevance Security
Service quality	Assurance Empathy Responsiveness

Use	Nature of use Navigation patterns Number of site visits Number of transactions executed
User satisfaction	Repeat purchases Repeat visits User surveys
Net benefits	Cost savings Expanded markets Incremental additional sales Reduced search costs Time savings

Table II-4. Delone & McLean's e-commerce metrics of success (Delone & McLean, 2003).

This thesis will generally regard a successful system as an effective system in which the system has achieved the optimal objectives in quality, use, user satisfaction, and benefits.

In order to more fully understand success, or effective information sharing, a case study from China is examined which illustrates successful information sharing in the business sector. Lu et al.'s (2006) case study describes the factors necessary for success in sharing information among organisations. Where an Information System (IS) refers to one organisation's system of collecting and processing information, Lu et al. uses the term Inter-Organisational Information System (IOS) to encapsulate the sharing of information among more than one organisation. IOS are complex systems, where multiple IS collaborate. In considering critical factors for information sharing effectiveness, Lu et al. has identified seven Critical Success Factors (CSFs) (Lu et al., 2006). These CSFs will be discussed more fully in chapter three, but are briefly defined here as follows:

1. Critical Success Factor (CSF)1 is characterised by a strong commitment by all stakeholders, both internally within each organisation and externally among the collaborative organisations.
2. CSF2 characterised by a unified motivation and vision which is shared by all stakeholders internally and externally.
3. CSF3 involves a cross-organisational implementation team, signifying solid support for users throughout the collaborative organisations.
4. CSF4 maintains the necessity that each organisation maintains a good internal information system which can handle data exchange efficiently.
5. CSF5, inter-organisational Business Process Reengineering (BPR) involves both process adjustments and new forms of cooperation between collaborating organisations, each making required adjustments where needed.
6. CSF6 specifies that each organisation maintain an advanced legacy IS and a mature infrastructure with adequate capability which would align well with the collaboration.
7. CSF7 requires shared industry standards, which specify that all technical and process standards among the collaborating organisations be aligned (Lu et al., 2006).

Chapter three will more fully investigate the CSFs critical factors for information sharing success.

2.2.7 Frameworks for information sharing

An information sharing framework has been identified as crucial for success in any information sharing venture (Halamka et al., 2005; Hill, 2006). The Office of the Information Commissioner has identified eight general principles for an organisation to address when constructing a framework for information sharing:

1. Decisions and reasons for sharing personal information.
2. Fairness and transparency in processing personal information.
3. Information must be maintained to a high standard of quality.
4. Information is to be retained only as long as necessary.
5. Security of information must be maintained, both technical and organisational.
6. Ensure system enables individuals to access their own information
7. Ensure individuals understand they are able to access their own information.
8. All information sharing procedures should be reviewed periodically (ICO, 2007).

One example of an information sharing framework is the *Barking & Dagenham Information Sharing Governance Framework*, in which the London Borough of Barking & Dagenham incorporated governance into its framework in order to clarify information sharing throughout the whole of its local authority (Barking & Dagenham, 2008). An information sharing governance framework would be expected to include:

- An Information Sharing Code of Practice, which outlines the principles and standards of expected conduct and practice of the organisation and staff within the organisation. The Code of Practice establishes the organisation's intentions, commitment and level of acceptability of practice of sharing information.
- Information Sharing Procedures, which describe the chronological steps and considerations required after a decision to share personal information has been made, e.g. the steps to be taken to ensure that information is shared securely. Information Sharing procedures set out, in detail, good practice in sharing personal information.
- Privacy, confidentially, consent (service users). The organisation should have in place a range of processes and documentation for service users including "Privacy/Confidentiality Statement", "Fair Processing Notice", "Consent", "Subject Access". Relevant staff within the organisation must understand these processes and be able to access documentation when required.
- Information Sharing Protocol (ISP). Where the organisation is involved in pre-specified, regular or bulk sharing of personal information with other organisations then the framework would also be expected to include one or more Information Sharing Protocols. An Information Sharing Protocol (ISP) is a signed agreement between two or more organisations or bodies, in relation to specified personal information sharing activity and/or arrangements for the routine of bulk sharing of personal information. An ISP relates to a specific personal information sharing activity and explains the terms under

which both (or all) organisations have agreed to share the information and the practical steps that need to be taken to ensure compliance with those terms (Barking & Dagenhem, 2008).

2.2.8 Case studies

The International Medical Informatics Association foresees a world-wide system approach for healthcare where "clinicians, researchers, patients and people in general will be supported by informatics tools, processes and behaviors that make it easy to do the right thing, in the right way, at the right time to improve health care for all. This systems approach will incorporate and integrate research, clinical care and public health. To achieve this vision it will require everyone being supported by informatics-based information and communication systems and technologies" (IMIA, 2009).

There is a growing body of empirical evidence supporting the global ST approach for effective information sharing among organisations, both in developed and developing countries and ST principles are emerging as essential to successful information sharing (Anderson et al., 2006; DeBor et al., 2006; Clifford et al., 2008).

The ST critical factors for successful information sharing not only illustrate the significance of electronic information sharing and thus support this thesis, but also point to a wider application of the Dynamic Multi-Agency Collaboration (DMAC) model more fully discussed in chapter five.

It is important to note that multi-agency collaborations in the health sector are currently more numerous than in other sectors such as social care or education. Thus, it is medical examples which this thesis has chosen to examine more closely. Table II-5 summarises a few of the selected case studies which illustrate the importance of the ST approach in global health IS. Each study lists the most important ST principle/ CSF, as defined earlier in this chapter.

Country (reference)	**Study involves…**	**Motivation**	**Single most important ST element or CSF**
China (Zhang et al., 2007	Investigation into IS of China's hospitals and public health organisations, data standards and health law	To reform China's healthcare nationwide and improve service efficiency	Standardisation is the basis for information sharing and interoperability; the absence of standards was found to be a "bottleneck" in improving health informatics (CSF7).
Israel (Lejbkowicz et al., 2004)	Analysis of EMR system structure and patterns of use in 23 hospitals	Goal: a successful IOS	Two essential elements are 1) understanding EMR structure and staff use pattern (ST5) 2) adoption of data standards is essential for the integration of EPRs across organisations (CSF7).
The Netherlands (Aarts et al., 2004)	Investigation into the implementation of a Computerised Physician Order Entry (CPOE) system	Further understanding of the implementation of a medical IS, realising that social and technical aspects are highly interrelated	Implementation of an IS 1) needs to be understood as a social process (Cherns, 1976), 2) is an unpredictable event (ST3), and 3) recognises that success and failure are socially negotiated judgments (ST3).

Peru (Blaya et. al., 2007)	Implementation of an electronic laboratory information system	To improve quality of care of TB patients in Peru	1) all stakeholders contribute to design (ST5) 2) political support is essential (CSF1) 3) adequate training (CSF3) 4) ensure the system's sustainability via user confidence (ST8).
South Africa (Byrne & Gregory, 2007)	Examination of communication in a rural health IS, in how concepts are recorded, terms used with their contexts, and local meanings for childhood illness and disease	To help vulnerable children and improve overall healthcare	"Communication goes beyond language" and is inherent in IS design; it is of utmost importance for an enabling environment for participants (ST7).

Table II-5. Summary of selected global studies illustrating the importance of socio-technical design over a range of systems and settings.

Lack of standards was found to significantly hinder health information systems in China's healthcare reform, according to an investigative study (Zhang et al., 2007). Zhang et al. found that the "lack of standards became a bottleneck to utilise and improve health informatics" and this lack was felt throughout the areas of finances, technology, culture and language, legal and ethics.

In a 2004 study looking at the importance of standards in information sharing, Electronic Medical Record (EMR) systems were evaluated in 23 Israeli public hospitals. The study began with the premise that "knowing the EMR systems features and pattern of use is an essential step for developing locally and nationally integrated systems" and set out to evaluate the status of Electronic Medical Record (EMR) systems in Israeli hospitals (Lejbkowicz et al., 2004).

Lejbkowicz et al. found that across the 23 hospitals studied, there was no standard data model which is an essential component for the integration of Electronic Patient Records (EPRs) and information sharing.

A major component of a typical information sharing system is the Computerised Physician Order Entry (CPOE), where a physician enters electronically the instructions for the treatment of a patient. A study in a large Dutch University Medical Center focused on the implementation of a new CPOE within the existing information sharing system, and argued that an implementation of a new technology is "a thoroughly social process in which both technology and practice are transformed" (Aarts et al., 2004).

In a Peruvian study the implementation of an electronic laboratory system was examined in the desire to improve the quality of care of tuberculosis patients (Blaya et. al., 2007). A web-based information system was designed and implemented in order to improve "the timeliness and quality of laboratory data" (Blaya et. al., 2007). The study found 1. All important stakeholders must contribute to the design and implementation 2. Political support is integral to the system's dissemination 3. Adequate training must be provided in the system's use and benefits 4. A need to ensure the system's sustainability via user confidence (Blaya et. al., 2007).

Communication was the subject of a 2007 study focusing on vulnerable children in rural South Africa (Byrne & Gregory, 2007). Examining how local terminology is related to IS design, this thesis proposed that communication goes beyond

language, and the goal was to create "an enabling environment in which people can participate in debate and discussion on equal terms" and to connect local communication terminology with national health authorities (Byrne & Gregory, 2007).

The above selected case studies are a sample of global electronic information sharing systems. Chapter three will examine three additional case studies in detail, a hospital network in Korea, an integrated healthcare information system in Tanzania and a military veterans' information system in the United States in order to further illustrate ST principles in use in widely varied IS.

2.2.9 Why people do not share

The above studies represent a sampling of the growing body of evidence which supports the ST approach to information systems design with the view that this approach is crucial for successful information sharing.

However, closer inspection at the organisational or departmental levels suggests numerous reasons why practitioners have problems sharing information with colleagues. Stan Garfield (2006) lists ten general reasons which often represent why people do not share:

1. They do not know why they should share; often leadership has not made a strong case for sharing.
2. They do not know how to share; they have received inadequate training.

3. They do not know what they are supposed to do it; leadership has not established and communicated clear goals.
4. They think the recommended way will not work; they have been given training and communication but they do not believe what they are being asked to do will work.
5. They think their own way is better; people are used to working in their own way or collaborating only with a small group of trusted comrades and believe this is the best way.
6. They think something else is more important; they believe there are higher priority tasks than knowledge sharing.
7. There is no positive consequence to them for sharing appropriately; they receive no rewards, recognition, promotions, or other benefits for sharing knowledge.
8. They think they are sharing; actually, they are sharing differently than the recommended ways.
9. They are rewarded for not doing it; they hoard their knowledge and thus get people to beg for their help, or they receive rewards, recognition or promotions based on doing other tasks.
10. They are punished for doing it; as a result of spending time on knowledge sharing, they do not achieve other goals which are more important to the organisation (Garfield, 2006).

It is often these social challenges which pose the most problems in information sharing; resulting communication barriers between organisations or professional groups can include "territorialism, status and power, competition for resources,

differing priorities, differing value systems, disrespect for each others' expertise, and lack of respect or mistrust of other professionals' perspectives" (Munro, 2005).

2.2.10 Data protection

But even as the government is promoting their plans and programmes, the theme of confidentiality continues to be a sensitive issue. In the healthcare sector, patient confidentiality has been described as a "minefield" (Panting, 2003). In spite of the Data Protection Act 1998 (DPA), the issue of patient/ client confidentiality demonstrates confusion, disagreement, and conflicting guidance (Sanderson et al., 2004; Tranberg & Rashbass, 2004; Allman, 2005; Anderson et al., 2006). Courts, ethical bodies and organisations view patient/ client confidentiality and consent quite differently, and they interpret the DPA in a variety of ways (Tranberg & Rashbass, 2004; Anderson et al., 2006).

The Information Commissioner's Office (ICO), an independent authority in the UK with the function of protecting personal information and promoting access to official information, has released statements regarding the supreme importance of personal data and the causes for concern regarding databases which hold personal information (ICO, 2006). As previously discussed, Richard Thomas, the Information Commissioner, asserts that "holding huge collections of personal data brings significant risks" (BBC, 2008).

In addition to the social elements which inhibit information sharing, there is an additional element which is a unique hindrance to information sharing among children's service organisations when sharing children's personal information: data protection. Time-consuming procedures have been criticised widely as resulting in delays in obtaining help and assistance for needy children while the social aspects of information sharing are carried out, such as fact-finding procedure, reports, and other processes (Camm, 2005).

In addition to these social hindrances to effective information sharing, confusion arising from data protection and confidentiality often causes a lack of timeliness as well, and requests for information are often not handled in a timely manner.

Chapter four will explore some of the barriers to information sharing, including privacy, confidentiality, and data protection, and the problematic areas which arise when processing children's personal information.

2.3 CRITICAL ANALYSIS

The sharing of personal information among health and social service organisations is a complex issue which can be problematic in a number of areas. The breadth of this literature review reflects the many elements which affect the information sharing process. Beginning with a look at electronic information sharing from diverse perspectives, several key themes have been included in this chapter.

Because sharing personal information is a multi-faceted issue, the diverse perspectives as a primary element introduce some to the ways in which the information sharing process is organised into various components. As shown earlier in this chapter, the Medical Records Institute organises its areas into technology, clinical and non-clinical practice, the data content itself, quality assurance, and performance (Waegemann, 2007). The Department of Veteran Affairs, USA, groups ninety-nine areas into infrastructure, administration, and clinical applications (Brown et al., 2004). The Centre for Social and Business Informatics, Newcastle University, contexualises the separate perspectives of the system user, practitioner, and policy as well as the integration aspects of workflow, procurement, and management (Wilson, 2006). All of these perspectives and ways of organising the information sharing process have been consolidated into the socio-technical (ST) approach which was introduced in this chapter and will be further discussed in chapter three.

The section on general terminology clarifies elements of the information sharing process, and provides the rationale of terms used in this thesis.

Because present-day public policy does not exist within a vacuum just as present-day technology or human processes are the result of past development, understanding the UK policy context is crucial to understanding the present climate in social care. The brief but important review of UK policy outlines some of the key areas of policy development over the last four hundred years, setting the stage for understanding the current challenges in social care.

The seven overlapping dimensions of the socio-technical (ST) approach in the complex information sharing process are fundamental to this thesis; the nature and beginnings of ST design are introduced here along with Cherns' original ST principles. Likewise, understanding the nature and history of Inter-Organisational Information Systems (IOS) within the business environment is implicit in the information sharing process. One key IOS criterion, interoperability among systems, is highlighted as both the human and technological aspects of interoperability constitute necessary functions of collaborative working, multi-agency working being a tenant of this thesis. Both the ST approach and the characteristics of IOS will be discussed more completely in the next chapter; both are fundamental to information sharing success; both highlight the necessity of a functioning model such as Dynamic Multi-Agency Collaboration (DMAC).

Dynamic Multi-Agency Collaboration (DMAC) is one solution to the myriad of difficulties of children's service organisations which desire a better system of working in partnership. DMAC addresses issues which are especially problematic in sharing children's personal information; these issues will be discussed more fully in chapter four. The socio-technical (ST) approach to information sharing is inherent in DMAC as are the Critical Success Factors (CSFs) which form the backdrop of information sharing in the DMAC model. DMAC takes into account best practice which has emerged from empirical study of Inter-Organisational Information Systems (IOS) as well as data protection and confidentiality issues. A graphical representation of DMAC will be included

in the next chapters as each element of this topic is explored, and DMAC itself will be more fully discussed in chapter five.

Although ST criteria and IOS form a basis on which organisations can operate collaboratively, an effective measurement of success is required. From the literature, Critical Success Factors (CSFs) and "best practice" are identified in order to form a framework for organisations' working practice. They have been introduced in this chapter and will be more fully discussed in chapter three. In addition, the next chapter includes an evaluation of the currently emerging national database, ContactPoint, according to the CSF structure.

One necessary component for successful multi-agency working is a framework for information sharing which has been designed and constructed by and for the organisations involved in the collaboration. The Office of the Information Commissioner (ICO) has established eight principles for an information sharing framework and one example has been used for illustration. Chapter four discusses in detail the absolute necessity of an information sharing framework; and chapter five includes a discussion of the DMAC model and of its business and technical frameworks – all underpinned by the DMAC timeline.

This chapter has set in context the need for collaboration among health and social care organisations in the UK. Globally, there is a growing body of evidence that the ST approach to information sharing is continually being implemented in new collaboration systems. Each system is unique, and each of the healthcare information sharing system was developed for different reasons,

from different perspectives, and measuring success in different ways. Five global case studies have been selected in this chapter; highlighted are their motivations for implementing the system itself, as well as the single most important ST success factor. Further, the next chapter will apply CSFs to three IOS: a hospital network in Korea, integrated healthcare information systems in Tanzania, and a military veterans' information system in the United States.

The remaining elements in the information sharing process represent particular issues. Ten reasons why people do not share information have been identified in this chapter; these reasons surface when obstacles arise in an information sharing collaboration. In chapter three for example, ContactPoint, analysed according to the CSF framework, is argued to demonstrate poor system design allowing for multiple obstacles in information sharing, including reasons for not sharing. The seven CSFs outlined, however, address these issues of not sharing and demonstrate how good user-centred design minimises practitioners not sharing information.

2.4 CONCLUSION

The goal of this chapter is to give a review of the relevant literature which is concerned with the information sharing process among organisations. This chapter illustrates the importance of information sharing as a global issue and identifies the themes in relevant literature which arise when organisations share information amongst themselves. These themes include best practice and the

application of Critical Success Factors (CSFs) through a socio-technical (ST) approach which is crucial for information sharing success.

The elements of information sharing success identified in this chapter are explored and developed throughout this thesis. Further, this chapter has built the foundation for two upcoming themes: firstly, the evaluation in chapter three of ContactPoint, the national children's database according to ST principles and, secondly, the introduction of DMAC, the proposed model which resolves problematic issues in sharing children's personal information, many or which have largely remained unaddressed.

The next chapter will detail effective information sharing using the ST approach and the critical factors for information sharing success. It will examine in detail the ST "lessons learned" in three case studies, and then proceed to evaluate ContactPoint according to these ST principles.

Chapter Three: Effective Information Sharing

3.1 INTRODUCTION

Sharing personal information is a multi-faceted issue which has experienced multiple changes in recent years. Many organisations, however, lack an integrated approach to deal with technical and other organisational elements and changes (Clegg, 2000). Because of the complexity of information sharing systems and their interaction with one another, this chapter will demonstrate that a socio-technical (ST) approach is necessary for an effective information sharing collaboration.

The ST perspective is one which has evolved from the social sciences, and it is considered here as an instrument in which to better understand and evaluate the design of the current emerging database, ContactPoint, and its surrounding information sharing processes. This chapter does not pretend to provide an exhaustive discussion and analysis of ST design nor present-day information sharing processes. Rather it provides an introduction to and evaluation of information sharing among organisations which provide services to children.

This chapter will consider the fact that a ST perspective based on empirical evidence is needed for the design of a large nationwide system. It is crucial that organisations which share children's personal information learn from the empirical evidence proposed by social scientists. Much is at stake in the construction of a national information sharing database and the many changes in the ways of working, yet unproven, which will be required. In addition, there may well be additional risks for children as well as the very high costs involved.

The construction of ContactPoint alone, without continuing maintenance costs, is estimated to be £224m.

Information about children is the subject material for this investigation into information sharing, and this chapter first considers it from the ST perspective. The discussion then turns to ST design for effective information sharing among multiple information sharing systems, or Inter-Organisational Information Systems (IOS). Various best practices and Critical Success Factors (CSFs) are identified based on the research literature; these CSFs are then defined and expounded. The CSF framework is then used to evaluate the national ContactPoint database. Further, CSFs are shown together as an integral component of Dynamic Multi-Agency Collaboration (DMAC) and depicted as such in the DMAC graphical model. Analysis then suggests how ContactPoint could best be taken forward.

3.2 BEST PRACTICE: THE SOCIO-TECHNICAL APPROACH AND CRITICAL SUCCESS FACTORS

The elements which comprise best practice in information sharing have been introduced in the chapter two, and they have included the socio-technical (ST) approach to the process of information sharing, with ST defined and discussed. Likewise, Critical Success Factors (CSFs) have been defined and discussed in the last chapter, section 2.2.6 and following. The present discussion now turns to ST characteristics and CSFs which form best practice in the information sharing process.

3.2.1 The Socio-Technical (ST) approach to Information System (IS) design

A socio-technical (ST) perspective of a system includes people and the roles they assume in the workplace, technology as a tool that people use to perform their jobs, and the design of the system in which people and technology function.

As previously identified in chapter two, socio-technical systems may include a variety of elements. Huff et al. (2005) organise them as follows:

- Hardware. *Mainframes, workstations, peripheral, connecting networks*. This is the classic meaning of technology. It is hard to imagine a socio-technical system without some hardware component. Hardware is often thought of as the microcomputers and their connecting wires, hubs, routers, etc.
- Software. *Operating systems, utilities, application programs, specialised code*. It is getting increasingly hard to tell the difference between software and hardware, but it is expected that software is likely to be an integral part of any socio-technical system. Software (and by implication, hardware too) often incorporates social rules and organisational procedures as part of its design (e.g. optimise these parameters, ask for these data, store the data in these formats, etc). Thus, the incorporation of social rules into the technology can make these rules harder to see and harder to change. Software in the emergency room is likely to be different from software in the elementary school. The software that does

not change (e.g. the operating system) may have been designed more with one socio-technical system in mind (e.g. Unix was designed with an academic socio-technical system in mind). The re-use of this software in a different socio-technical system may cause problems of mismatch.

- Physical surroundings. Buildings also influence and embody social rules, and their design can affect the ways that a technology is used. The manager's office that is protected by a secretary's office is one example; the large office suite with no walls is another. The physical environment of the military supplier and the elementary school are likely to be quite different, and some security issues may be handled by this physical environment rather than by the technology. Moving a technology that assumes one physical environment into a different environment one may cause mismatch problems.
- People. *Individuals, groups, roles (support, training, management, line personnel, engineer, etc), agencies*. Note that listed here are not just people (e.g. Mr. Jones) but roles (Mr. Jones, head of quality assurance), groups (Management staff in quality assurance) and agencies (The Department of Defense). In addition to his role as head of quality assurance, Mr. Jones may also have other roles (e.g. a teacher, a professional electrical engineer, etc). The person in charge of the microcomputers may have very different roles in the different socio-technical systems, and these different roles will bring with them different responsibilities and ethical issues. Software and hardware designed assuming the kind of support one would find in a university environment

may not match well with an elementary school or emergency room environment.

- Procedures, *both official and actual, management models, reporting relationships, documentation requirements, data flow, rules & norms*. Procedures describe the way things are done in an organisation (or at least the official line regarding how they ought to be done). Both the official rules and their actual implementation are important in understanding a socio-technical system. In addition, there are norms about how things are done that allow organisations to work. These norms may not be specified (indeed, it might be counter-productive to specify them). But those who understand them know how to, for instance, make complaints, get a questionable part passed, and find answers to technical questions. Procedures are prime candidates to be encoded in software design.
- Laws and regulations. These also are procedures like those above, but they carry special societal sanctions if the violators are caught. They might be laws regarding the protection of privacy, or regulations about the testing of chips in military use. These societal laws and regulations might be in conflict with internal procedures and rules. For instance, some companies have implicit expectations that employees will share (and probably copy) commercial software. Obviously these illegal expectations cannot be made explicit, but they can be made known.
- Data and data structures. What data are collected, how they are archived, to whom they are made available, and the formats in which they are stored are all decisions that go into the design of a socio-

technical system. Data archiving in an emergency room it will be quite different from that in an insurance company, and will be subject to different ethical issues as well (Huff et al., 2005).

A ST system is interdependently designed so that at the point of intersection of any of the social and technical elements, optimisation is achieved (Cherns, 1976; Clegg, 2000).

Cherns' (1976, 1987) seminal research, as discussed in chapter two, was updated by Professor Chris Clegg more than a decade later (Clegg, 2000). Clegg (2000) identified nineteen ST principles from Cherns' original research as well as exploring the advancement of technology in the workplace, particularly computing systems (Cherns 1976; Clegg, 2000). Clegg further classified the principles into three types: meta-principles (encompassing overall design issues), content principles, and process principles (Cherns, 1976; Clegg, 2000). Table III-1 summarises Clegg's nineteen socio-technical (ST) principles along with their type.

	ST Principle	**Type**	**Description**
P1	Design is systemic	Meta	All aspects of a system are interconnected with none taking precedence over the other; all are jointly designed
P2	Values and mindsets are central to design	Meta	Humans are assets (not costs) and the experts in the system; technology and techniques are tools to support them

P3	Design involves making choices	Meta	Key choices include system operation, management, organisation, technology, and the management of the design and implementation process
P4	Design should reflect the needs of the business, its users and their managers	Meta	A system needs to be useful and to meet some articulated purpose
P5	Design is an extended social process	Meta	Design is extended over time and is not a singular event; design is furthermore social and technology may be tailored to meet the needs of users
P6	Design is socially shaped	Meta	Design choices are social phenomena and subject to social shaping
P7	Design is contingent	Meta	Design choices are contingent and do not necessarily have universal applicability; there is no "one best way"
P8	Core processes should be integrated	Content	Organisations can be viewed as comprising a number of core processes that typically cut laterally across different functions; a job should incorporate a whole task, rather than a fragmented part
P9	Design entails multiple task allocations between and amongst humans and machines	Content	System design allocates tasks amongst humans, between hardware and software, and between humans and machines
P10	System components should be congruent	Content	A new design involves a set of working arrangements which need to be congruent with surrounding systems and practices
P11	Systems should be simple and make problems visible	Content	A simple system will promote ease of use; visible problems can be dealt with more immediately

P12	Problems should be controlled at source	Content	Problems controlled in this way are 1. motivational because people like to have control over the problems they face 2. cognitive because people learn to perform better through exerting control and by anticipating and solving problems 3. logistical because it is quicker to solve a problem locally than to wait for an "expert" to visit
P13	The means of undertaking tasks should be flexibly specified	Content	One should not over-specify how a system will work; while the ends should be agreed and specified, the means should not
P14	Design practice is itself a ST system	Process	Design processes can themselves be highly complex systems which also need to be designed; ST thinking, ideas and principles are applicable to such systems
P15	Systems and their design should be owned by their managers and their users	Process	Fundamental among ST principles is compatibility between process and outcome; this highlights the need to involve users in design
P16	Evaluation is an essential aspect of design	Process	The ST system emphasises pluralistic evaluation; A ST perspective explicitly assumes a commitment to evaluating the performance of new system against the goals of the organisation and the people in it, and includes the explicit inclusion of social, technical, operational and financial criteria
P17	Design involves multi-disciplinary education	Process	Pluralism is of utmost importance in ST design; people from different roles and disciplinary backgrounds who have different skills, experience and expertise all contribute to the design process

P18	Resources and support are required for design	Process	Vital and necessary design resources and support include funds, time and effort; knowledge, expertise and skill (including knowledge of social issues); methods, tools and techniques for ST design; structures and mechanisms that allow these principles to be enacted
P19	System design involves political processes	Process	The design, implementation, management, use and evaluation of new ST systems are not trivial matters; strong support and commitment is required by senior managers

Table III-1. Nineteen principles of socio-technical design. *Adapted from Clegg, 2000.*

Clegg's (2000) overarching ST design principles which he labels meta-principles are "intended to capture a worldview of design." The values and mindsets of humans remain fundamental to meta-principles, with technology tailored to meet the needs of humans. According to the meta-principles, the components of ST design are characterised by interconnectedness and are jointly designed in context of the other components. Design choices are social phenomena, subject to social shaping, and contingent on other choices. An important underlying meta-principle is that design choices have universal applicability and there is no "one best way" (Clegg, 2000).

The principles of content, Clegg (2000) refers to as embodied in simple design resulting in integrated information flow to make problems visible, with these problems being controlled at the source. Clegg further specified that the task

allocation should be flexibly specified with multiple allocations between and amongst humans and machines (Clegg, 2000).

Process principles influence the design process, with pluralism a key feature of ST design. Pluralism includes the necessity of multi-disciplinary input into system design, "bringing together people from different roles and disciplinary backgrounds who have different skills, experience and expertise to offer the design process," sharing their views and expertise. Pluralism works toward the goal of system design which is owned by managers and users (Clegg, 2000).

3.2.2 Critical Success Factors (CSFs) of an Inter-Organisational Information System (IOS)

Although multiple definitions of success exist, this study utilises the six areas previously discussed in chapter two, section 2.2.6, and identified by DeLone and McLean (2003) in table II-4: systems quality, information quality, service quality, service use, user satisfaction, and net benefits (DeLone & McLean, 2003). DeLone and McLean's six areas of success are inherent in Lu et al.'s (2006) seven identified CSFs, and these CSFs encompass multiple levels which must be present for an effective information sharing system (Lu et al., 2006). Lu et al. groups the CSFs into areas with related characteristics which he refers to as clusters: the decision motivation cluster, the implementation process cluster, and the infrastructure condition cluster. Table III-2 provides a list of the Critical Success Factors (CSFs) identified by Lu et al. along with the cluster to which each belongs.

Critical Success Factor	Cluster
CSF1 Strong internal and external commitment	Decision motivation
CSF2 Shared motivation and vision	↓
CSF3 Cross-organisational implementation team	Implementation process
CSF4 High integration with internal information systems	↓
CSF5 Inter-organisational Business Process Re-engineering (BPR)	↓
CSF6 Advanced legacy information system and infrastructure	Infrastructure condition
CSF7 Shared industry standards	↓

Table III-2. List of Lu et al.'s Critical Success Factors (CSFs) along with the corresponding cluster (Lu et al., 2006).

Thus far the discussion has described IS design according to ST principles in the context of one organisation's IS. Yet, this discussion is not complete because the subject of this thesis is the information sharing collaboration among multiple IS. In order to complete the illustration of ST principles in the context of multiple IS, it is necessary to expand this discussion.

The information sharing collaboration among multiple IS is labeled by Lu et al. (2006) as an Inter-Organisational Information System (IOS), in which organisations "transcend their traditional information system boundaries" (Lu et al., 2006). According to Lu et al., the IOS is typically more complex than a traditional IS because of technology and management issues, as information sharing not only involves more than one system, but multiple IS sharing information at a variety of levels and using a variety of methods (Lu et al.,

2006). The IOS case study undertaken by Lu et al. involves two businesses sharing information, and the factors which emerged as critical for effective information sharing between them. From the study, Lu et al. (2006) have identified seven critical factors for success. These Critical Success Factors (CSFs) are ST principles, demonstrating more specifically ST design in multiple collaborating IS, or IOS (Lu et al., 2006).

According to Lu et al. (2006), the IOS "involves two or more parties being electronically linked up for the purpose of conducting their business activities; it follows then that issues related to working in partnership are likely to feature prominently" (Lu et al., 2006). This idea of shared vision and trust is the foundation of effective information sharing and is found in the first two CSFs: CSF1-Strong internal and external commitment and CSF2- Shared motivation and vision. Oddly enough, many information sharing projects, including schemes which are e-government driven, ignore this vital first step (Anderson et al., 2006). Developing trust between government and stakeholders, and working from a shared vision with potential future system users appears to be ignored entirely in the current government plan for the ContactPoint database (ECM, 2007a, 2007b, 2007c, 2008b, 2008c). Further, a "top-down" approach, is often given as a reason for lack of information sharing success (Anderson, 2005; Guzman & Trivelato, 2008). The information culture and organisational culture of any organisation must be in step with the information sharing culture, and a level of trust among all parties must be in place (Anderson, 2005; CST, 2005; Garfield, 2006; Widén-Wulff, 2007).

CSF3, CSF4, and CSF5 address implementation and it is the implementation of joint information systems which often remains a difficulty. One reason is that organisations' individual systems have developed separately over time serving their individual purposes. This can result in obstacles in areas such as conflicting requirements, priorities, and funding and also confusion over the information culture of the organisation, roles of staff, and timescales of tasks (Allman, 2005; Anderson, 2005; Hirst, 2006).

Finally, CSF6 and CSF7 relate to the infrastructure condition. Shared standards are basic to any successful electronic information sharing system, and must be well-defined and implemented (CST, 2005; AC, 2005; Hill, 2006). "It is therefore important that agencies establish consistent processes …. There is a great deal of guidance available for the front-line practitioner, much of which emphasises the need to make decisions on a risk assessed, case-by-case basis. However, front line services will struggle to deliver this kind of approach if the organisations that support them do not provide a managed framework within which it can sit" (Grayson et al., 2005).

3.2.3 Application of Critical Success Factors (CSFs) to three Inter-Organisational Information Systems (IOS)

The last chapter introduced socio-technical (ST) principles, including Cherns' original nine principles of ST design; this chapter has further discussed ST principles, including the nineteen principles of ST design as identified by Clegg (Cherns, 1976; Clegg, 2000). Various studies propose that a successful

implementation of an information system is largely determined by organisational factors (Aarts et al., 2004).

Case studies of three very different healthcare information sharing collaborations, with their implementation and maintenance, are now examined in order to determine successful factors for information sharing within the healthcare environment. Each system in the study is unique, and each of the healthcare information sharing system was developed for different reasons, from different perspectives, and measuring success in different ways. Studies in healthcare were chosen to be examined here because studies in social care systems collaboration, which maintained an electronic information sharing system, were not available.

1. A hospital network in Korea. In Korea, there has been a rise in inter-hospital cooperative networks since the 1990s which are based on financial competition (Kim & Burns, 2007). Kim & Burns have undertaken a study which describes information sharing in partner relationships between tertiary hospitals providing specialised care, and community hospitals providing non-specialised, short-term care (Kim & Burns, 2007). The case study collected data from thirty-four tertiary-community hospital dyads and examined collaborative capability, cooperative relationship management, cooperative relationship quality, partner orientation, and top management. The study uncovered the success factors which contributed to improved hospital performance (Kim & Burns, 2007).

2. Integrated healthcare information systems in Tanzania. The integration of health systems was the focus of a case study in Tanzania (Smith et al., 2008). The authors maintain that health is a serious development issue, and that a strong correlation exists between health and development. Poor or limited healthcare service delivery is caused by "the adoption of narrow, managerialist perspective of integration" (Smith et al., 2008). The Tanzanian government introduced the Health Management Information System (HMIS) in an effort to improve general healthcare throughout the country and to eradicate disease. Although there are multiple challenges to address in healthcare sector reform in a developing country, the integration of multiple standalone systems at a local level was considered a major element to improve healthcare (Smith et al., 2008). Smith et al. found that integration of systems involved much more than purely the technical integration, but included fundamentally the ways of working and the social relations as well (Smith et al., 2008).

3. A military veterans' information system in the United States. The information sharing system in the United States Department of Veterans Affairs began integrating its various agencies in the 1980s (Brown et al., 2003). According to Brown et al., this large and established national network included 163 hospitals, 800 clinics, 135 nursing homes, and 206 counseling centres. Its challenges included maintaining a successful information sharing network throughout the past two decades of vast technological change, continual reorganisation within the organisation, while keeping up-to-date with healthcare advances (Brown et al., 2003). Table III-3 compares the three case studies and each study's single most important success factor.

Country (reference)	System	Type of collaboration	Motivation	Single most important success factor
Korea (Kim & Burns, 2007)	Various partner hospital networks; local	Multiple dyadic partnerships between tertiary and community hospitals	Out-perform competitors of rival hospital collaborations	Success depends more on collaborative process than on the structure or capabilities of the organisations
Tanzania (Smith et al., 2008)	Health Management Information System (HMIS); national	Integration of multiple small standalone healthcare systems	Healthcare reform and improving healthcare to communities	Integrating ways of working and social relations -- as well as managerial integration of functions and data -- are crucial to a successful information sharing system
United States (Brown et al., 2003)	USA Department of Veterans Affairs (VA); national	Extensive information sharing system between hospitals, surgeries, community clinics, nursing homes, domiciliaries, counseling centres, and other facilities	Increase level of service to USA military veterans, as well as support medical research and provide support for medical education	Early formation of an empowered implementation committee is essential, well in advance of the actual implementation

Table III-3. Comparison of case studies and their single most important success factors (Brown et al., 2003; Kim & Burns, 2007; Smith et al., 2008).

These three studies represent widely varied information sharing partner organisations and information sharing system design and represent different institutional contexts. They were selected for inclusion in this thesis precisely because they represent the diverse nature of information sharing systems, yet

demonstrate how successful information sharing can occur in a variety of settings. This study reveals that the factors which provide for successful information sharing are not particular to the type or scale of information sharing systems.

There were specific factors which needed to be addressed in each study. For example, in Korea, it was advisable that each partner member be in close geographic proximity to its corresponding partner (Kim & Burns, 2007). In the Tanzanian study, a prime area to be addressed was the "mismatch between the organisational structure of the administration, and the local community" (Smith et al., 2008). Despite the specific factors represented by these three studies, the different histories of their respective healthcare systems, and differing reasons for undertaking an information sharing collaboration, what they all have in common is the fact they have undergone an implementation of an electronic information sharing system -- and have demonstrated success.

The studies also describe the very different reasons for implementing an electronic information system, the process of implementation and management of very different types of electronic information sharing systems, yet all describe the factors which contributed to information sharing success.

3.2.4 Critical Success Factors of Decision Motivation

It was found that when organisations were considering an information sharing system, the reasons behind the decisions to implement the system were

"extremely significant" for their future success (Lu et al., 2006). The first two critical success factors relate to decision motivation of the partner organisations, and they are related and overlapping.

CSF1, the first Critical Success Factor, asserts that there must be strong internal and external commitment on the part of each organisation to share information. The commitment could stem from any number of factors, such as financial reasons, long term strategy, or the achieving of goals collaboratively which could not be achieved individually.

This success factor, strong internal and external commitment, is reinforced by all three case studies. In the Korean study, Kim & Burns (2007) assert that, not only do relationships need to be developed among partners for successful information sharing, but these relationships are just as important as the information sharing system design. Further, Kim & Burns found that it is necessary for the partners' commitment to the project to be developed both in advance and after the project has been deployed (Kim & Burns, 2007).

Brown et al. (2003) also reiterate the importance of early formation of an empowered implementation committee, well in advance of actual implementation in the study involving the United States Department of Veterans Affairs (Brown et al., 2003). In addition, Kim & Burns (2007) found that successful collaboration depended upon interpersonal contacts and partnering behaviours supported by information development. In addition, openness and

reciprocity supported by top management was crucial for successful collaboration (Kim & Burns, 2007).

In Tanzania, one reason that greater success may not have been experienced was the fact that some of the desired strong motivation was lacking throughout the government (Smith et al., 2008).

CSF2 asserts there must be a shared motivation and vision. In Lu et al.'s (2006) case, of the two organisations which would be sharing information, there was a history of ten years of cooperation between them before any information sharing system implementation began. A major factor was the trust which was built into their shared history before any talk of a new shared information system.

Lu et al. (2006) found that top management of each company discussed in detail the blueprint and objectives of the proposed system and an agreement on the final process and details of the shared system, which was finally reached -- but only after much negotiation and compromise. This agreed blueprint was released to stakeholders for feedback, which was then incorporated into the final plan of the project. The clear business vision shared by the top management of both organisations and also all the stakeholders would reduce differences of opinion which would eventually arise in the implementation process (Lu et al., 2006).

Regarding trust, Kim & Burns (2007) assert that "trust obviates the need for exclusive or heavy reliance on monitoring and safeguards. In trust-based relationships, new information and innovations can be transferred more fluently and the deeper tacit nature of information can be shared" (Kim & Burns, 2007). Brown et al. (2003) found that "the formation of an empowered user committee early on" -- rather than as a patch for a partly failed implementation commanded solely from the top-down -- was the single most important CSF (Brown et al., 2003).

Lu et al.'s (2006) CSF2 was reiterated repeatedly by the three case studies which have concluded that it is essential to build trustworthy relationships among partners for successful information sharing (Lu et al., 2006). Trustworthy relationships include support from top management as well as top medical staff (Kim & Burns, 2007). It is interesting to note that sometimes Kim & Burns found that physicians were unwilling to cooperate with healthcare staff in other organisations. Kim & Burns concluded that it is necessary, before information sharing partnerships are decided and launched, all top staff must understand the collaborative IOS project and support it (Kim & Burns, 2007).

Smith et al. (2008) also found that it is vital to create current awareness of the situation so that improved data will result (Smith et al., 2008). Smith et al. describes one district which performed particularly well in integrating its standalone systems, with a performance rated high above the norm. Although there were several reasons for its success, one reason was that the supervisory body worked hand-in-hand with the village health workers (Smith et al., 2008).

3.2.5 Critical Success Factors of Implementation Process

The three critical success factors which relate to the implementation process are centred around the detailed operational and managerial aspects. CSF3 emphasises the necessity of cross-organisational implementation teams. There were three parties involved in the teams described by Lu et al. (2006): the two organisations and a third-party implementation vendor. Four teams were formed from these three parties. The first team, the management team, was comprised of the top executives of the two organisations, demonstrating strong commitment to the project by upper management. It was the management team which organised the project, coordinating the other three teams. The technical team consisted of highly skilled technicians, mostly from the third party vendor. The business team was comprised of the business departments of both organisations, defining optimal business processes for the project from the early stages throughout the implementation. The partner team were members of the larger partner organisation which initially established the IOS project. All three parties were actively engaged with effective communication and close cooperation throughout the implementation process through the implementation teams.

All three case systems in Tanzania, Korea, and the United States incorporated some form of cross-organisational efforts. In the Tanzanian study, Smith et al. (2008) found that local systems' collaboration with each other was essential in continually developing information strategy, reorganising data flow and

assessing technical capabilities of the standalone systems; this was administered by strong central management (Smith et al., 2008). Continued and thorough training in the implementation process throughout the different organisations was also crucial for successful implementation of the information sharing system, particularly in the areas of information management. Also, continual training at all levels encouraged high-quality planning and decision-making (Smith et al., 2008).

In the Korean study, Kim & Burns (2007) found it was vital that the organisational partnership continually foster shared resources and systems of cooperation (Kim & Burns, 2007). Within these systems of cooperation, Kim & Burns assert that strong leadership in top management needs to lead the collaborative organisations in order enable them to better deal with problems as they arose (Kim & Burns, 2007).

In the American study, Brown et al. (2003) established that implementation teams guided by national strategy were central for success (Brown et al., 2003). The national implementation teams merged systems in response to organisational mandates. These teams also supported the information sharing organisations, and this high-intensity support from clinical and administrative leaders was crucial during early implementation days. Like Smith et al.(2008), Brown et al. concluded a continually developing cross-organisational information system was vastly preferable to a one-time, big-bang deployment (Brown et al., 2003).

Lu et al. identified the necessity of high integration of internal information systems among the collaborating organisations as CSF4 (Lu et al., 2006). Each partner must maintain a strong internal information system and the shared information system between the two partners also must work at an optimal level. However, it is not the strong information sharing system between the two organisations which is the goal of the project, but rather the value-added to the resulting IOS. The smooth information sharing process of the two systems is the means to achieve the value-added goal (Lu et al., 2006).

The added value of each medical system can be related to each system's motivation for undertaking information sharing. In Tanzania, the value added to the high integration of standalone systems was improving the health of the population. The high integration involved sharing fundamentals among the systems, accomplished in part by using more user-friendly resources, effective communication, training staff and monitoring by quality control (Smith et al., 2008).

In the Korean system, the value of a successful information sharing system lay in succeeding over competition. High integration of information sharing systems emphasised the facilities within an organisation and between organisations to support effective communication (Kim & Burns, 2007).

Brown et al. (2003) describe the motivation for the United States system as primarily improving service to its military veterans, and also supporting medical research and providing support for medical education. The high integration of

the various Veterans Administration internal systems involved that the applications being built on a common data dictionary and database, and using the same core building blocks to provide the various functionality of its ninety-nine applications (see Appendix A) (Brown et al., 2003).

CSF5 embodies inter-organisational Business Process Reengineering (BPR). Lu et al. found that certain elements of BPR needed to be changed (Lu et al., 2006). Certain processes were no longer needed due to the new shared system. It was also necessary to train staff in redefining duties and responsibilities. These new ways of working were vital because business processes had changed and it was now necessary for staff now to work more cooperatively between the two partner organisations.

Regarding the BPR in the veterans' system, Brown et al. (2003) found streamlined communication was crucial for information sharing success in patient data exchange between requesting organisation and the responder organisation. The system's Remote Data Views (RDVs) share patients' clinical data between partner organisations automatically and nearly instantaneously (Brown et al., 2003).

Although Kim & Burns do not detail BPR in the Korean hospital network system, they do emphasise the need for communication throughout the implementation process (Kim & Burns, 2007).

In the Tanzanian study, Smith et al. (2008) found that when undergoing the BPR process, it was crucial to integrate not only the systems and processes, but also the information management and the socio-political and cultural mindsets related to the BPR (Smith et al., 2008). In fact, integrating ways of working and social relations -- as well as managerial integration of functions and data -- was the most important factor for successful implementation (Smith et al., 2008).

3.2.6 Critical Success Factors of Infrastructure Condition

Elements of the technological underpinning define the last two CSFs (Lu et al., 2006). Each partner organisation needed to have in place a strong technological system in order for a strong shared system to result as the new IOS was more technologically demanding and complex. CSF6 is the necessity of a robust technological infrastructure on the part of each partner organisation. One of the partner organisations in Lu et al.'s study carried out a holistic evaluation of a number of organisations' legacy systems and infrastructure in order to better determine readiness for implementing a new IOS (Lu et al., 2006).

Kim & Burns (2007) assert that a lack of strong management supporting the technological infrastructure may be a reason for a certain amount of lack of success in the Korean model (Kim & Burns, 2007). Likewise, in the Tanzanian study, Smith et al. (2008) cite lack of robust technology as to hindering a greater measure of success, and better software with staff training was needed.

According to Smith et al., neither adequate skills and resources, nor a system design were available to design and construct a strong technological information system (Smith et al., 2008).

Brown et al. (2003) describes a mature technological infrastructure system in the American study which traces its beginnings to the late 1970s. In 1982 a system was implemented at eight sites nationwide. This early implementation has developed over the years to a robust system which includes:

- scalability - adding a new medical center to the national whole is similar to adding a new processor to a local cluster.
- instant information exchange via remote data views which can rapidly locate and bring data to the desktop from anywhere in the country.
- revolution in medical documentation by developing the Graphical User Interface (GUI) which has greatly increased clinician acceptance of ERs.
- all clinical documents are entered and accessed electronically, including all forms of clinical notes, physician orders, consultations, procedure reports, and radiology and pathology examinations; no legacy paper charts exist, and the only "wet-signed" patient documents - procedure consents and living wills – are kept in a single notebook (Brown et al., 2003).

CSF7, the shared industry standard, is required for smooth electronic transactions among organisations. According to Lu et al., "such standards enable companies to establish better business cooperative relationship, reduce cost and improve productivity" (Lu et al., 2006).

Neither Kim & Burns (2007) nor Smith et al. (2008) include a discussion of a shared technological standard or types of standardisation in their study, because their focus is on other factors of success rather than technological factors.

Because of the mature system Brown et al. (2003) describe in the American study, there were shared technological standards implemented in the system's history (Brown et al., 2003). The information sharing system made use of a national standard dictionary rather than site-specific data dictionaries; this standard dictionary helped to resolve semantic problems. The system of the United States Department of Veterans Affairs (VA) also used other standards, such as the National Drug File (NDF), as well as common database and programming conventions. A technical review has provided sufficient guidance to ensure that applications function in harmony. Brown et al. conclude that using dissimilar database services would have resulted in disintegrated incompatible "stovepipe" or "silo" systems such as those found in many other institutions today. Hardware choices were also standardised, with local sites permitted to add hardware from an approved list as needed; printers, workstations, and other ancillary devices were left under the local organisation's control.

3.2.7 Critical Success Factors (CSFs) in Dynamic Multi-Agency Collaboration (DMAC)

As has been illustrated above, CSFs demonstrate more specifically ST design in multiple collaborating IS or IOS and form the groundwork for effective information sharing among organisations. CSFs are embedded in Dynamic Multi-Agency Collaboration (DMAC), the theoretical model described briefly in the last chapter, section 2.3. DMAC is designed to address problematic areas of information sharing, incorporating ST principles and CSFs, which as a unit form the backdrop and maintain an integral presence in DMAC design. DMAC will be more fully discussed in chapter five.

The CSFs of decision motivation, implementation process, and infrastructure condition form the stage on which DMAC operates. All organisations operating within the DMAC system maintain a united focus, desiring that children be kept safe and free from harm, and therefore have undergone necessary implementation procedures, applicable reengineering between systems, and appropriate infrastructure for collaboration between systems.

The DMAC graphical model is now introduced; further components will be added to the model as the discussion progresses. When the DMAC graphical model is fully populated, it will illustrate the way in which the elements of effective information sharing, underpinned by the timeline, fit together to complete the DMAC model. Figure III-1 illustrates the integral contribution of

the CSFs in the DMAC model.

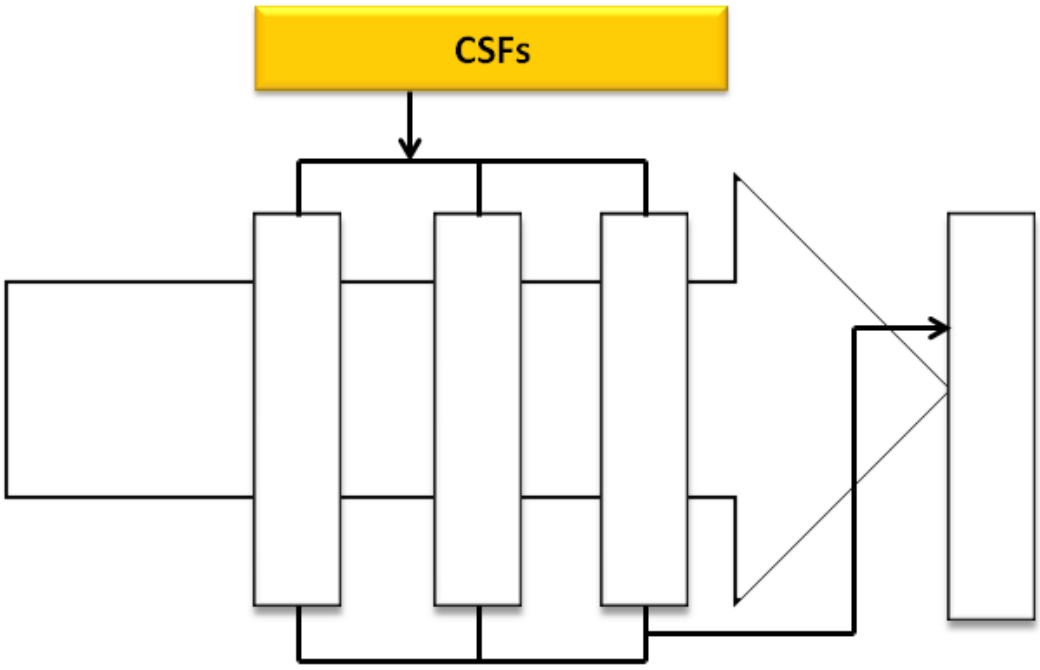

Figure III-1. CSFs together as an integral component in the DMAC model.

3.3 EVALUATION OF CONTACTPOINT USING THE ST/ CSF STRUCTURE

At the time of this writing, ContactPoint is the emerging national database for all children under the age of 18, underpinned by Section 12 of the Children Act 2004. It is designed to streamline multi-agency working among children's service organisations, and the Every Child Matters (ECM) programme asserts that it will simplify the information sharing process. It is designed to function as an online directory, holding basic information about children such as name, address, gender, date of birth, contact details for carers and contact details for practitioners working with the child. The government claims that ContactPoint will be "the quick way to find out who else is working with the same child or young person, making it easier to deliver more coordinated support" (ECM,

2007c). ContactPoint is a key element of the ECM programme and the Integrated Children's System (ICS), which is "an applied conceptual framework…and a practice tool for working with children in need and managing these detailed information requirements" (ECM, 2007c).

It is especially relevant to note that Lord Laming, in the Victoria Climbié Inquiry Report of 2003 in which Lord Laming highlighted grossly deficient areas in healthcare, social care, and law enforcement, outlined many improvements of information sharing in particular among children's service organisations (Laming, 2003). These recommendations were a loose set of criteria which many hoped would be an actual improved system of information sharing among children's service organisations. When the resulting system was designed, however, the result was a technical solution. Although Lord Laming endorsed the idea of ContactPoint, many organisations, Information Technology (IT) experts, frontline professionals, and others have found ContactPoint to be faulty and inadequate (Davies, 2008; Elliot, 2008; Murray, 2008; Pierce, 2008; Peckover et al., 2009).

The following discussion evaluates key areas of ContactPoint design and the surrounding information sharing systems in light of ST principles and CSFs. This evaluation is crucial because of various design factors which are now emerging as the ContactPoint database begins its implementation stage. Broadhurst et al., (2009) refer to "faulty design elements" in the assessment process of children's services, and Carafano (2006) describes interagency activities as flawed due to lack of interagency operational organisation and

models (Carafano, 2006; Broadhurst et al, 2009). If there are faulty design areas in the ContactPoint and the surrounding ICS system, it is imperative they are identified and addressed at an early stage. The following evaluation points consider several key elements of ContactPoint design.

1. The "top-down" approach. According to ECM (2008a), ContactPoint's design and implementation illustrates a top-down approach because its decision for existence and entire plan of construction and implementation has been led by government (ECM, 2008a).

In a study comparing two approaches for information system design and management, the ST approach and the top-down approach, Guzman and Trivelato (2008) found the ST approach to be superior to the top-down approach (Guzman & Trivelato, 2008). There is great concern over that fact that e-government initiatives are being developed "without sufficient attention to understanding the needs of frontline workers" (Munro, 2005).

Clegg (2000) underscores pluralism as an essential element of ST design, where people from different roles and disciplinary backgrounds, with different skills, experience and expertise, are brought together, sharing their unique views and expertise (Clegg, 2000). These unique professional perspectives are then assimilated into system design. Clegg asserts that "a multi-disciplinary approach to design is more likely to foster creative and innovative solutions" (Clegg, 2000).

2. Technology-led. Clegg (2000) further asserts that many investments in IT are technology-led, "reflecting too technical an emphasis" (Clegg, 2000). According to ECM, "ContactPoint is fundamentally a technology solution and the [Common Assessment Framework] and [Integrated Children's System] are supported by technology" (ECM, 2007c). This statement appears to follow ST principles which assert that technology supports human endeavor. Upon closer inspection, however, a different message emerges. The technology itself, the database ContactPoint, has been set up as the mainstay of multi-agency working and "ContactPoint will be the quick way to find out who else is working with the same child or young person, making it easier to deliver more coordinated support" (ECM, 2008a).

Clegg (2000) cautions against unbalanced system design and "the charge of the Byte Brigade" with the perpetual over-emphasis on technological solutions and attempts to design the social system around the technology (Clegg, 2000). ST theory has at its core the view that systems can only work effectively if social and technical elements are brought to work together and interdependently in a system; he further cautions that "many technical innovations are substantially less effective than intended" (Clegg, 2000).

In many instances technology can be strongly asserted by vendors as the sorely needed solution to the information sharing problem. According to Lu et al. (2006) however, technology is merely the tool, one component in a complex process, to be used in a particular context as outlined in CSF6 and CSF7. It is necessary for CSFs 1 through 5 first to be implemented – beginning with a

strong internal and external commitment and a level of trust which has been built over time among all stakeholders (Lu et al., 2006).

3. Users contribute little or no input into system design. The government has claimed to consider input from consultations, workshops, etc, but has then set itself up as the system designer of ContactPoint and the ICS (Munro, 2005; ECM, 2008a); frontline or other users have had little or no substantial influence on system development.

Clegg's fifteenth socio-technical principle (P15), as listed in Table III-1, specifies that systems and their design should be owned by their managers and their users. Clegg asserts "too often the implicit argument is that we, the designers of a new system, are trying to find ways of getting you, the users, to participate in its design. A reversal is required, for example, that we, the managers and users of a new system, need to find ways of getting you, the experts in various forms of design (including technology, business processes and work organisation), to help us design how we are going to work" (Clegg, 2000).

The idea of user-centred system design is echoed in Broadhurst et al. (2009) who assert that "design of an effective system needs to be based on the needs of users and on a thorough understanding of their working practices" (Broadhurst et al., 2009). In addition, professionals in the forefront are not given the opportunity to express their information sharing difficulties and their work areas which need support (Munro, 2005). ContactPoint is being

constructed without the input of the experts who interact with IS and share information on a regular basis.

4. Competing interests of stakeholders. According to Clegg's (2000) sixth socio-technical principle (P6), system design is socially shaped, there are many factors which influence design. Multiple, competing interests may all vie for attention and inclusion in system design. Technologists may be pursuing innovations which interest them. Consultants may be pursuing their own products and services. Organisation or company representatives may be advancing the organisation's interests. Users and potential users may be asserting their own ideas. Outside agencies may wish to gain a foothold to advance their agendas. It takes great care and restraint on the part of ST system designers to design without advancing their own "hobbies" and to ensure their efforts are not driven by or caught up in the latest fads (Clegg, 2000).

Hence, there is a contrast between input and design. There is a great difference between, on the one hand, accommodating competing views, interests, and agendas into a system design and, on the other hand, avoiding fads and designing an effective, integrated ST system.

5. Absence of flexible specification. Flexible specification is at the heart of ST design and it is not an easy element to design and implement (Cherns, 1976, 1987; Clegg, 2000). The design should not over-specify how a system will work and "whilst the ends should be agreed and specified, the means

should not" (Clegg, 2000). Clegg's tenth socio-technical principle (P10) states that the workers themselves, being the local experts, should be allowed to develop their own ways of working and solve their own problems. The ECM programme (2007c), by contrast, outlays an intensely specified agenda for ContactPoint along with ICS and Common Assessment Framework (CAF) (ECM, 2007c). This highly specified programme has been constructed for managing detailed information requirements and integrated service delivery. This programme has not granted professionals in the forefront of practice the opportunity to develop its application to ways of working in which they are expert.

6. Trust among stakeholders is absent. The idea of trust is an absolute necessity. If there is a lack of strong internal and external commitment, lack of shared motivation and vision, and a lack of trust, a successful information sharing system cannot result (Brown et al., 2003; Kim & Burns, 2007; Lu et al., 2006; Smith et al., 2008). A foundation of mutual trust must be laid, and several elements must be included in the first steps of an information sharing system -- a strong motivation to work collaboratively, determined commitment to the process, long term strategy, and shared vision for integrated working.

There is much opposition voiced to ContactPoint, however, which illustrates a lack of trust in the government's new information sharing system and a lack of shared motivation and vision. Such opposition is fuelled by fears that:

- The database could be exploited by abusers.
- There is a real danger of sensitive data being mislaid or lost.

- ContactPoint could be used by police to hunt for criminals in an unacceptable way.
- ContactPoint would increase risk to vulnerable children, rather than protect them.
- There are insurmountable logistical obstacles to implement.
- It will be impossible to maintain the integrity of data (Elliot, 2007; Davies, 2008; Murray, 2008; Pierce, 2008).

3.3.1 Additional problematic areas surrounding ContactPoint

In addition to the preceding discussion of the national database, further problematic areas surrounding ContactPoint persist. Criticisms and complaints regarding a mammoth national database abound in news reports as well as peer-reviewed journals. However, it is beyond the scope of this thesis to list all areas of concern. Rather, concerns from professionals in the forefront of practice are considered and discussed.

In connection with children's organisations, ContactPoint brings numerous difficulties for information sharing, as does any database or registry which holds children's information, or is beyond a certain size and scope (Anderson et al., 2006). Richard Thomas, Information Commissioner, in an interview with BBC and a speech to the Royal Society of Arts, stated clearly: "… creating giant databases of personal information would carry "significant risks" for the UK.… The more databases that are set up and the more information exchanged from one place to another, the greater the risk of things going wrong. The more you

centralise data collection, the greater the risk of multiple records going missing or wrong decisions about real people being made. The more you lose the trust and confidence of customers and the public, the more your prosperity and standing will suffer. Put simply, holding huge amounts of personal data brings significant risks" (BBC, 2008).

Professionals encounter various risks and other problems as well. Security issues, including access, raise the greatest concerns by far for many professionals. The view that there are many security flaws in the system, or that the entire system is inadequate is affirmed by many, including Professor Ross Anderson, a security specialist at the University of Cambridge: "It is a shocking way to go about building a system. The public sector wastes huge amounts of money on software that ultimately doesn't work" (Murray, 2008). Further security concerns arise because government officials have been responsible for major losses of personal information by way of mislaid datasticks and discs (Elliott, 2007; Pierce, 2008).

Access concerns and the large numbers of people "authorised" to access ContactPoint remain major areas of concern for many, especially teachers and social workers (Elliott, 2007; Murray, 2008; Pierce, 2008). The Association of Directors of Children's Services (ADCS) continues to express concerns over who will be responsible for vetting users and policing the system. They maintain that an existing or potential abuser could obtain access to ContactPoint with only limited repercussions (Elliott, 2007; Pierce, 2008).

Keeping data on ContactPoint up-to-date is another area of concern. One local authority official admitted, "Protecting children is already challenging enough. Our internal data systems are already unreliable and this will just make things worse" (Murray, 2008).

The House of Lords' Select Committee on Merits of Statutory Instruments has issued a warning that "the enormous size of the database and the huge number of probable users inevitably increase the risks of accidental or inadvertent breaches of security, and is likely to bring the whole scheme into disrepute" (Elliott, 2007).

Ian Brown, a computer security research fellow at Oxford Internet Institute pointed out that the sheer size alone of the ContactPoint database poses very large risks; "When you have got more than 300,000 people accessing this database, it's just very difficult to stop the sale of information" (Elliott, 2007).

Because ContactPoint is considered a risk and because it is impossible to ensure that no unauthorised access or data loss will occur, it is irresponsible on the part of the government to implement it (Pierce, 2008). Anderson agrees: "If you allow large numbers of people access to sensitive data it's never going to be secure. You can't protect it. ContactPoint should simply never have been built" (Anderson et al, 2006; Murray, 2008).

Other problematic areas include e-discrimination, ineffectiveness of social interventions, inaccurate interpretation of law, and the potential harm in sharing

children's personal information. In e-Discrimination, organisations which process children's information often pay extra attention to data which may show that a child is at risk of becoming delinquent, or having other types of problems at school or elsewhere. Law-abiding children who do not do acceptable work in school may be unnecessarily highlighted for troubling behaviours, with the organisation's expectation turning into a self-fulfilling prophecy (Anderson et al., 2006).

One reason for the existence of a national database is to make available a child's cumulative record from place to place if s/he has moved from one local authority to another (ECM, 2008a). This discrimination can be dangerous in many settings, but particularly in education. Professor Ross Anderson, a specialist in security at the University of Cambridge, highlights this fact. "The more teachers know about children, the lower the expectations. In Germany, for example, teachers are not even allowed to know whether a child has been top or bottom of the class when they move schools. Children should have the right to start afresh" (Murray, 2008).

The Office of the Information Commissioner likewise stresses the importance of minimising the risks of profiling: "Where a child is placed in a risk category, it becomes very difficult for them to ever be viewed in any other way by those who come into contact with them in the future however they conduct themselves. This form of stigmatising runs the risk of becoming a self fulfilling prophecy for those affected" (ICO, 2006).

Concerning ineffectiveness of social interventions, data are collected with the intent of achieving effective measures in social intervention. According to Every Child Matters, the database will inform practitioners of others who are working with the same child, so that a child can be helped more quickly (ECM, 2007c). This reasoning assumes practitioners will be using ContactPoint. A natural outcome of ineffectiveness of social interventions is the fact that some practitioners may not be using ContactPoint because of the ineffectiveness of social interventions, or any other number of reasons. Ineffectiveness of interventions will not be helped by the high vacancy rate in social worker posts, upwards of ten percent in some local authorities (Mickel, 2009b).

Inaccurate interpretation of data protection law, human rights law, and privacy law is widespread. Although "many of these abuses stem more from ignorance than from malice, practitioners and public alike need to be educated and warned, with resulting enforcement action taken, if necessary (Anderson et al., 2006). Serious data protection concerns are raised regarding the "appropriateness of collecting, processing and retaining the data" (Anderson et al., 2006). Because of the legal implications involved in information sharing among organisations, the Royal Borough of Kensington and Chelsea, one of the ContactPoint trailblazers, acted on legal advice and withdrew from the information sharing pilot as they would be unable to use "primary trust data to populate a local information sharing index" (Sale, 2007).

In addition to the above, some professionals believe that sharing personal information has potential to cause harm. "Government documentation and

guidance is mostly unbalanced in that it ignores the dark side; it pays little heed to family values, therapeutic effectiveness, trust and privacy" (Anderson et al., 2006).

Government's insistence on a national database and its potential to cause harm are also the reasons why many are concerned about security risks in gathering, holding and processing personal information (Lovell, 2008). Deloitte's ContactPoint Data Security Review stated that "risk can only be managed, not eliminated, and therefore there will always be a risk of data security incidents occurring" (Deloitte & Touche, 2008).

The existence of the ContactPoint database promotes unease in many that government holds information that is not needed for any purpose. Increasingly there is concern over the government's lack of transparency and accountability as well as lack of faith in the government's ability to securely store personal information (Pierce, 2008; Mickel, 2009a).

Responsible audit for ContactPoint use and ensuing breeches of irresponsible use are other areas of concern. Unanswered questions continue to be asked: Who will audit ContactPoint? Will legal sanctions be involved for offenders? How will they be enforced? (Elliott, 2007; Davies, 2008; Murray, 2008; Pierce, 2008).

The fact that police may access to ContactPoint is great cause for alarm as this capability was outside of original intent of the database. Liberal Democrat peer,

Baroness Sue Miller, is deeply concerned: "This development totally undermines the purpose of ContactPoint by making it children versus authority" (Davies, 2008; Pierce, 2008). There is lack of faith that the government can actually construct and run effectively any large IT project effectively, as they have, arguably, never yet done so successfully (Pierce, 2008; Mickel, 2009a).

3.3.2 Security in the Dynamic Multi-Agency Collaboration (DMAC) model

In Dynamic Multi-Agency Collaboration (DMAC), security is essential as one of three components which together form a requisite building block in the formation of DMAC. Just as Critical Success Factors (CSFs) form the backdrop to DMAC, security contributes to a three-part building block as laid out in DMAC's technical framework. DMAC's business and technical frameworks are discussed more fully in chapter five.

Figure III-2 illustrates the essential element of security in the DMAC model.

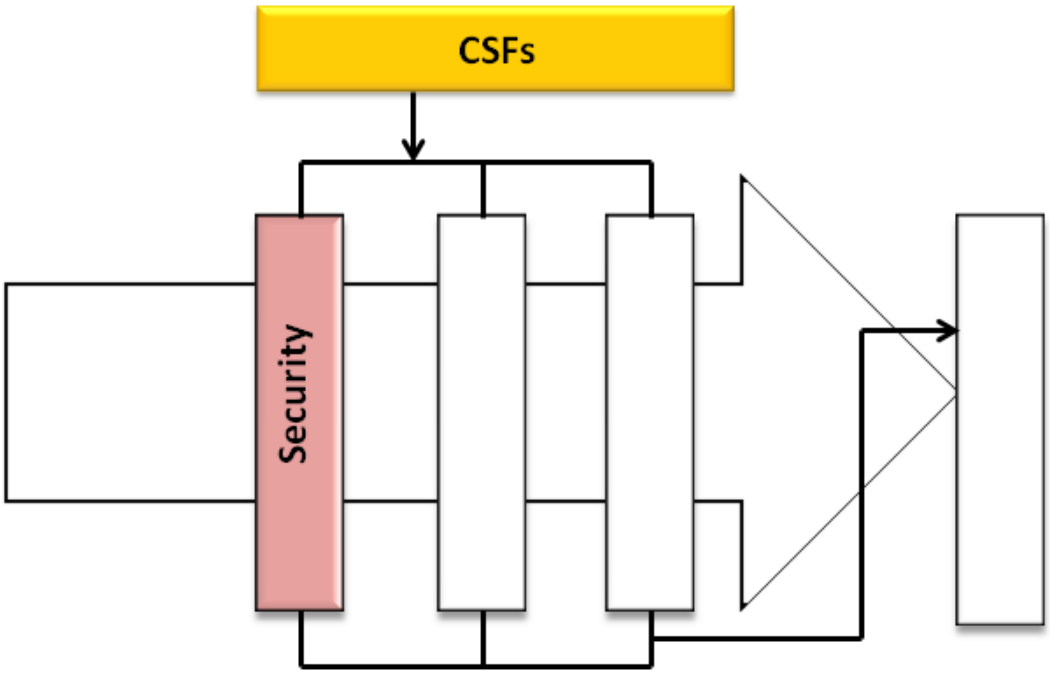

Figure III-2. Security as an essential element in Dynamic Multi-Agency Collaboration (DMAC).

3.4 ANALYSIS: MOVING FORWARD

As the situation stands at the time of writing, the national children's database, ContactPoint, is in the beginning stages of implementation. A question which might be considered is what, if anything, can now be done in order to rescue ContactPoint, using ST principles, in order to build a more robust and effective information sharing process? Although there are doubtless many valid responses to this question, the author proposes four areas with which to begin.

1. Foster a strong spirit of trust among all stakeholders. As discussed in this chapter, essential infrastructure is lacking in current ContactPoint design. Trust is the underlying factor for success, and it translates into strong internal

and external commitment (CSF1), and a shared motivation and vision (CSF2). According to Lu et al. (2006), these two CSFs are crucial for a successful information sharing collaboration among organisations, or IOS (Lu et al., 2006). Because of the complexity of IOS, strong motivation is essential in order to develop, implement and operate an effective information sharing system as is clear and shared vision for all stakeholders (Lu et al., 2006).

According to Lu et al. (2006), trust is a factor which needs to be nurtured over time and as one of the issues related to working in partnership it is crucial for successful collaborative working. In order to begin to foster a spirit of trust, patience is required by all organisations involved. In Lu et al.'s study, stakeholders began by holding transparent discussions in which each stakeholder was made aware of psychological perceptions of the other organisation. In addition, differences in opinions, management styles, and processes were aired. These discussions led to the beginnings of commitment, strong motivation, and shared vision by stakeholders. For effective collaboration, it is to be highlighted that developing trust is a prerequisite to the implementation of shared processes and technology, and is not considered merely an aid to assist in an implementation process already underway. Patience is a difficult area for organisations desiring to collaborate, but a necessary one as it took the organisations ten years in Lu et al.'s study to develop a spirit of trust with the resulting commitment and vision (Lu et al., 2006).

2. Build the necessary infrastructure. In addition to the lack of trust, commitment and shared vision, ContactPoint lacks additional factors for success: cross-organisational implementation team (CSF3), high integration with internal information systems (CSF4), inter-organisational business process reengineering (CSF5), advanced legacy information system and infrastructure (CSF6) and shared industry standards (CSF7) (Lu et al., 2006).

In order for an effective information system a ST approach is crucial, with its design employing ST principles. As well as new systems designed from the ST approach, ST design can also be used to redesign an existing system, utilising a more realistic view of organisations, and restoring effectiveness and functionality (Bostrom & Heinen, 1977).

Guzman & Trivelato (2008) describe a ST approach to solving a problem in one scenario using Social Simulation. Social Simulation is a process which integrates ST, contingency and change management approaches while at the same time addressing people, technology and organisational issues (Guzman & Trivelato, 2008). Social Simulation may represent one solution in addressing many of ContactPoint's problems.

3. Address unevenness and inconsistency. Social workers and other professionals handle a wide range of issues on a day-to-day basis. Additionally, social workers are often trained in certain areas of specialism but gain work experience in additional areas. The situations in which they operate and the activities they perform are wide and varied. These variable and

complex processes, which have matured over time, do not easily accommodate tidy, straightforward systems.

Making information sharing decisions on a case-by-case basis is a subjective exercise which is bound to result in inconsistencies among decisions made. Yet, practitioners are called upon to handle personal information, possibly of great sensitivity, and to make decisions which can result in life or death (Bellamy et al., 2005). Relying on "professional judgement" is necessary. However, this reliance can also make available a susceptibility to oversights, mistakes, disparity, and possible ultimate unfairness. DMAC addresses irregularity by streamlining the information sharing process and leaving less opportunity for unevenness and inconsistency.

4. Consider a local approach. As this thesis asserts, a database on a local authority level has many advantages over a national scheme such as ContactPoint. This chapter has discussed one area of professional concern, in particular, that of access and security in a children's database. Because ContactPoint is envisioned on such a large scale, it poses multiple problems because of its size, because of the huge number of probable users accessing data which would inevitably increase the risks of security breaches (Elliott, 2007). In addition, maintaining a very large database, keeping information up-to-date, auditing access and enforcing unauthorised activity – all remain problematic areas of concern.

If ST principles were to be applied to a children's database, and this database were to be created at the local authority level, many of the access and security risks would be greatly reduced because of the reduced size of the database.

Many political conservatives and others favor the local approach (Lovell, 2008). The Conservatives, who voted against ContactPoint in the Commons, would propose instead the promotion of data sharing between key local professionals and smaller local databases. The government insists a national database is needed for children who move from one local authority to another. If, however, children were to be moving across local authority boundaries, and if they would cause concern, they could be traced to the relevant professional at their previous address (Pierce, 2008). DMAC would likewise function well on a smaller, local scale.

Table III-4 outlines some of the challenges voiced by practitioners in health and social care (Carafano, 2006; Elliot, 2007; Sale, 2007; Davies, 2008; Murray, 2008; Pierce, 2008; Broadhurst et al., 2009; Mickel, 2009a; Peckover et al., 2009) along with a corresponding CSF application which may improve the information sharing among children's service organisations.

Information Sharing Challenge	**CSF application**
Tensions of conflicting professional paradigms	CSF1 Improve motivation by communicating at a fundamental level in order to understand differing ideals in order to build trust (CSF2)

Staff resistant to change	CSF3 Implement a cross-organisational team including change management
Numerous information cultures manifested within a department	CSF1 Improve motivation by communicating at a fundamental level in order to build trust (CSF2)
Resentment of staff on imposition of new agenda by management or government	CSF2 Build trust between stakeholders over time so all come to agree on a clear vision for the future
Lack of trust in management or government	CSF1 Improve motivation by communicating at a fundamental level in order to build trust (CSF2)
Disagreement over consent issues	CSF5 Adjust socio- and technical processes for maximum usability allowing for differing points of view when necessary
A top-down approach for information sharing has been imposed upon an organisation, and the decision-making management has ignored the necessity of involving frontline staff who work with information sharing on a regular basis	CSF2 Build trust between stakeholders over time so all come to agree on a clear vision for the future
Misunderstanding between different organisations on terminology	CSF3 Implement a cross-organisational team to formalise terminology

Technology touted as the solution to information sharing problems	CSF5 Adjust socio- and technical processes for maximum usability and build stakeholder co-operation on adjusted process
Practitioners unused to efficient information sharing	CSF5 Adjust socio- and technical processes for maximum usability and build stakeholder co-operation on adjusted processes
Inadequate, outdated, and/ or inaccessible computer workstations; poorly functioning software and user access; inadequate technical support	CSF6-7 Assess hardware, software, and usability practice in order to update and make ready for implementing shared standards
Low computer literacy levels of staff	CSF3 Implement a cross-organisational team including robust staff support
Excessive time necessary for information to be shared between children's service organisations on a particular child	CSF5 Adjust socio- and technical processes for maximum usability and build stakeholder co-operation on adjusted process
Practitioner fear of sharing personal information and "doing something wrong"	CSF3 Implement a cross-organisational team to clarify sharing issues
A very large gap which exists between theory and practice	CSF2 Build trust between stakeholders over time so all come to agree on a clear vision for the future

Poor communication between departments and levels of the same organisation	CSF3 Implement a cross-organisational team to include sustainable training in communication

Table III-4. Examples of information sharing challenges with a corresponding CSF application (Carafano, 2006; Elliot, 2007; Sale, 2007; Davies, 2008; Murray, 2008; Pierce, 2008; Broadhurst et al., 2009; Mickel, 2009a; Peckover et al., 2009).

3.5 CONCLUSION

As has been shown, there is a high level of information sharing complexity among IOS. This chapter has provided empirical evidence that it is highly possible to achieve information sharing success among organisations. Best practice has been described using the ST approach and CSFs, then applied to three IOS. A few key areas of the ContactPoint database were then evaluated according to ST design principles in order to illustrate the components which the national database is lacking and the steps which can be taken in order to bring ContactPoint into a robust and highly effective system. This examination results in the conclusion that, in an absence of ST principles in information system design, faulty design may lead to limited effectiveness.

Concerns regarding ContactPoint, the government's answer to the information sharing issue, continue to be voiced by professionals in health, social care and technology. Many professionals are deeply concerned about e-discrimination, the ineffectiveness of social interventions, the inaccurate interpretation of data

protection law, human rights law and privacy law, the apparent insensitivity of the government and risks to children, and security and access issues.

There is great merit in the government's motivation in constructing ContactPoint and the Integrated Children's System. An integrated approach with supporting technology is socio-technically sound. However, the government would do well to additionally consider the voices of empirical evidence and specialist experience as identified in this chapter. "Investments in new technology … are typically poorly integrated and face massive problems" (Clegg, 2000). As will be discussed in chapter five, DMAC provides an effective solution which addresses these concerns.

In the next chapter, the discussion turns to some of the barriers which can hinder effective sharing including data protection issues, lack of timeliness, and an absence of a working framework among organisations.

Chapter Four: Barriers to Effective Information Sharing

4.1 INTRODUCTION

The previous chapters have shown that sharing information among organisations in health and social care is a complex issue because of social and technical issues, and requires a careful consideration of the whole of the information systems involved in the collaboration. In an organisation's information system, there is a social component of the system (e.g., the practitioners), the tasks component (e.g., tasks which practitioners perform), and the technology component (e.g., the technology which practitioners use in completing necessary tasks). Social issues can include the assorted layers of organisational divisions, departments, hierarchical structures, professional specialisms, boards, committees, and teams which contribute to or coordinate information sharing; technical issues can include rapidly changing technology with accompanying costs, choice of the right software and hardware, handling legacy systems, adequate technological support, and related issues (Curry & Moore, 2003; Garfield, 2006).

The previous discussion has considered an organisation's Information System (IS) from a socio-technical (ST) perspective. Additionally, where two or more organisations' information systems interact, the term Inter-Organisational Information System (IOS) has been used to describe the interaction of IS, and the discussion has included Critical Success Factors (CSFs) for effective information sharing among IOS. Best practice for information sharing have been identified and described and the CSFs have further been applied to three

IOS. The national database, ContactPoint was then evaluated according to the CSF structure.

Now the discussion turns to focus more specifically on the barriers to information sharing in conjunction with children and their needs and requirements, primarily in health and social care. This chapter provides a background and overview of the concept of privacy in light of data protection. This chapter further explores key data protection issues and why implementing data protection principles often become a major hindrance to effective sharing. In addition, both lack of timeliness and lack of operating within a framework are identified as further barriers to sharing personal information.

Effective information sharing is crucial to assisting children, in order to provide appropriate assistance in a timely manner at their point of need (Laming, 2003; Bichard, 2004). As outlined in chapter one, following the Victoria Climbié inquiry, Lord W. Herbert Laming submitted a report to Parliament in January of 2003 which outlined 108 recommendations for improvement in social services, healthcare, and police organisations; many of these recommendations directly involve more efficient and effective information sharing (Laming, 2003). The Laming Report further describes data protection as a hindrance to efficient information sharing. According to section 1.46 of the Laming Report (2003), "the free exchange of information about children and families about whom there are concerns is inhibited by the legislation on data protection and human rights." Section 17.28 continues this theme: "Central to this question is the issue of confidentiality. Some participants had developed practical approaches

to this issue, but many said there was confusion among professionals as to when they were allowed to share information with each other without the consent of the child or of his or her carers. The general view seemed to be that many professionals found that current guidelines rely too much on individual judgement and would be assisted by clear, central guidance on these issues, to which reference could be made by staff on a day-to-day basis" (Laming, 2003). Because the concept of data protection is central to privacy, this thesis explores the historical development of data protection and how it is played out in current practice. Arising from data protection issues, this chapter will identify the key issues of confidentiality and timeliness which encumber and obstruct the information sharing process and which can be obstacles to effective information sharing.

4.2 PRIVACY, CONFIDENTIALITY, AND DATA PROTECTION

In the broadest sense, the term "privacy" is a social construction, its meaning variable according to societal group, historical context, geographic location and current popularity (Booth et al., 2004; EPIC, 2006).

Privacy has been defined in a number of ways, but according to the Calcutt Committee, the government Committee on Privacy and Related Matters chaired by David Calcutt QC (Crone, 2002), privacy is "the right of the individual to be protected against intrusion into his personal life or affairs, or those of his family, by direct physical means or by publication of information" (Calcutt, 1990; EPIC, 2006).

Privacy International (PI) is an international human rights advocacy group comprised of specialists and human rights organisations from more than forty countries united to defending personal privacy worldwide. PI underscores the fact that privacy is a fundamental human right. In many countries, international agreements that recognise privacy rights such as the International Covenant on Civil and Political Rights or the European Convention on Human Rights have been adopted into law (PI, 2007).

The Electronic Privacy Information Center (EPIC) is a public interest research organisation based in Washington DC. EPIC further defines privacy and separates the concept of privacy into four categories:

Bodily privacy concerns the protection of people's physical selves against invasive procedures such as genetic tests, drug testing and cavity searches. **Privacy of communication** covers the security and privacy of mail, telephones, e-mail and other forms of communication. **Territorial privacy** concerns the setting of limits on intrusion into the domestic and other environments such as the workplace or public space. Territorial privacy includes searches, video surveillance and ID checks. **Information privacy**, also called data protection, involves the establishment of rules governing the collection and handling of personal data such as credit information, and medical and government records (EPIC, 2006).

Confidentiality may be defined as the "ethical principle or legal right that a physician or other health professional will hold secret all information relating to a patient, unless the patient gives consent permitting disclosure (AHSMD, 2009). Although the Data Protection Act 1998 defines sensitive personal data (see following), it offers no definition of confidentiality. According to the International Advisory Committee for the United Nations Educational, Scientific and Cultural Organization (UNESCO) Memory of the World Programme Sub-Committee on Technology for the General Information Programme, confidentiality can be thought of as "the quality of protection against unauthorised access to private or secret information" (UNESCO, 2008).

Privacy plays is a crucial role when sharing personal information, particularly when it is children's information involved. The appropriate use of privacy, including confidentiality and data protection, is an essential element for effective information sharing. In Dynamic Multi-Agency Collaboration (DMAC), the model which is introduced in chapter one and discussed fully in chapter five, privacy maintains its place as another of the components in the building block in DMAC's foundation. Figure IV-1 illustrates privacy as an embedded element in Dynamic Multi-Agency Collaboration (DMAC).

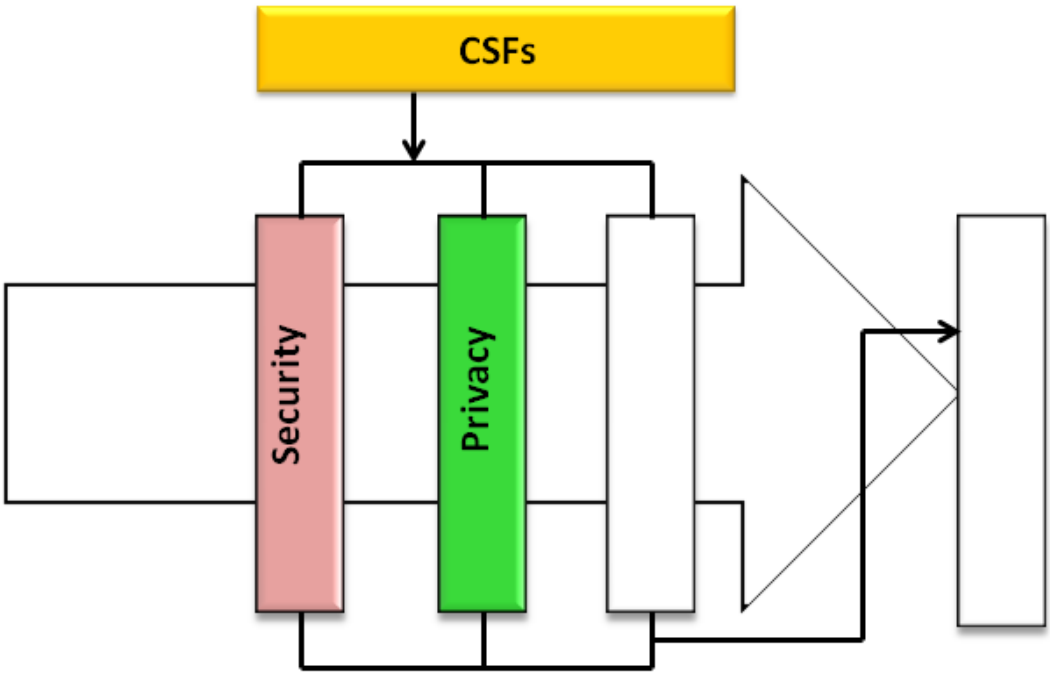

Figure IV-1. Privacy embedded in Dynamic Multi-Agency Collaboration (DMAC).

The EU Data Protection Directive emphasises both oversight of data protection and enforceability when breeches occur and particularly regards enforcement of the Data Protection Act 1998 as paramount to protecting data (EPIC, 2006). Enforcement is managed within the UK by the Information Commissioner's Office (ICO, 2008b).

It is the Office of the UK Information Commissioner (ICO) which is the independent agency appointed by the government to, among other things, protect personal information and to enforce and oversee the Data Protection Act 1998 (ICO, 2008b).

The Data Protection Act mainly covers personal information held electronically. According to the ICO, personal data "means information about a living individual who can be identified from that information and other information which is in, or likely to come into, the data controller's possession" (ICO, 2009). Sensitive personal data means personal data consisting of information as to:

- the racial or ethnic origin of the data subject,
- his political opinions,
- his religious beliefs or other beliefs of a similar nature,
- whether he is a member of a trade union,
- his physical or mental health or condition,
- his sexual life,
- the commission or alleged commission by him of any offence, or
- any proceedings for any offence committed or alleged to have been committed by him, the disposal of such proceedings or the sentence of any court in such proceedings (OPSI, 1998).

From a historical perspective, a variety of legislation paved the way for the Data Protection Act 1998 (DPA). One of the reasons why privacy issues in the twenty-first century are of such a thorny nature is due to the historical development of data protection, primarily in the last 20 years. Table IV-1 lists major legislation underpinning data protection and children's issues.

Date	Legislation	Concerned with . . .
1989	UN Convention on the Rights of the Child 1989	United Nations: identifies that children need special care and protection and that the family is the main form of protection for children; emphasises the need for legal protection for the child before and after birth and the importance of respecting the cultural values of a child's community
1991	Children Act 1989 (enacted 14 October 1991)	Section 17, 47, and schedule 2 impose functions which Social Services Departments are legally obliged to undertake with other agencies legally obliged to cooperate in some circumstances under section 47(11)
1998	Crime and Disorder Act 1998	Section 115 of this act enables any person to disclose information to a relevant authority (including local authorities, NHS bodies, and police authorities) for purposes of the prevention and reduction of crime and the identification or apprehension of offenders; the goal is to create safer communities by placing obligations on local authorities tackling crime and disorder
1998	Human Rights Act 1998	Article 8 of the European Convention of Human Rights was incorporated into UK law under the Human Rights Act 1998 and confers the right of respect for an individual's private and family life, home and correspondence; information sharing can be justified under Article 8 if it is necessary to protect the health and welfare of a child, or to prevent crime.
2000	Data Protection Act 1998 (came into effect in 2000)	Eight principles regarding the holding and processing personal information; gives specific rights to individuals with respect to organisations which hold their personal information
2000	Local Government Act 2000 (Well Being)	Empowers the authority to promote the wellbeing of the community; this is a wide statutory function, and so could provide the basis for sharing information
2000	Human Rights Act 1998 (enacted 2 October 2000)	incorporates the rights and freedoms guaranteed under the European Convention on Human Rights (ECHR)
2001	Health and Social Care Act 2001	Section 60 addresses issues of confidentiality, privacy and security as it relates to health and social care

2004	Children's National Service Framework (NSF)	Part of the NSF, the Children's NSF sets standards for children's health and social services and interfaces those services with education
2004	Children Act 2004	Legal underpinning for Every Child Matters; section 12 provides for the ContactPoint national database
	Common Law Duty of Confidence	Not an Act of Parliament, this duty of confidence has been built up in case law over time; courts have found a Duty of Confidence to exist where a contract provides for information to be kept confidential under certain conditions

Table IV-1. Major legislation underpinning data protection and children's issues.

The UK Parliament approved the Data Protection Act in 1998 in order to execute the EU Data Protection Directive. The DPA came into effect in 2000 and is based on eight data protection principles. These principles require that personal information:

1. Shall be processed fairly and lawfully and, in particular, shall not be processed unless specific conditions are met.
2. Shall be obtained only for one or more specified and lawful purposes, and shall not be further processed in any manner incompatible with that purpose or those purposes.
3. Shall be adequate, relevant and not excessive in relation to the purpose or purposes for which they are processed.
4. Shall be accurate and, where necessary, kept up to date.
5. Shall not be kept for longer that is necessary for the specified purpose(s).
6. Shall be processed in accordance with the rights of data subjects under the Act.

7. Should be subject to appropriate technical and organisational measures to prevent the unauthorised or unlawful processing of personal data, or the accidental loss, destruction, or damage to personal data.
8. Shall not be transferred to a country or territory outside the European Economic Area unless that country or territory ensures an adequate level of protection for the rights and freedoms of data subjects in relation to the processing of personal data (UKNA, 2008).

Legal issues form the third element in the foundational building block in the DMAC model. Figure IV-2 illustrates legal issues embedded in DMAC.

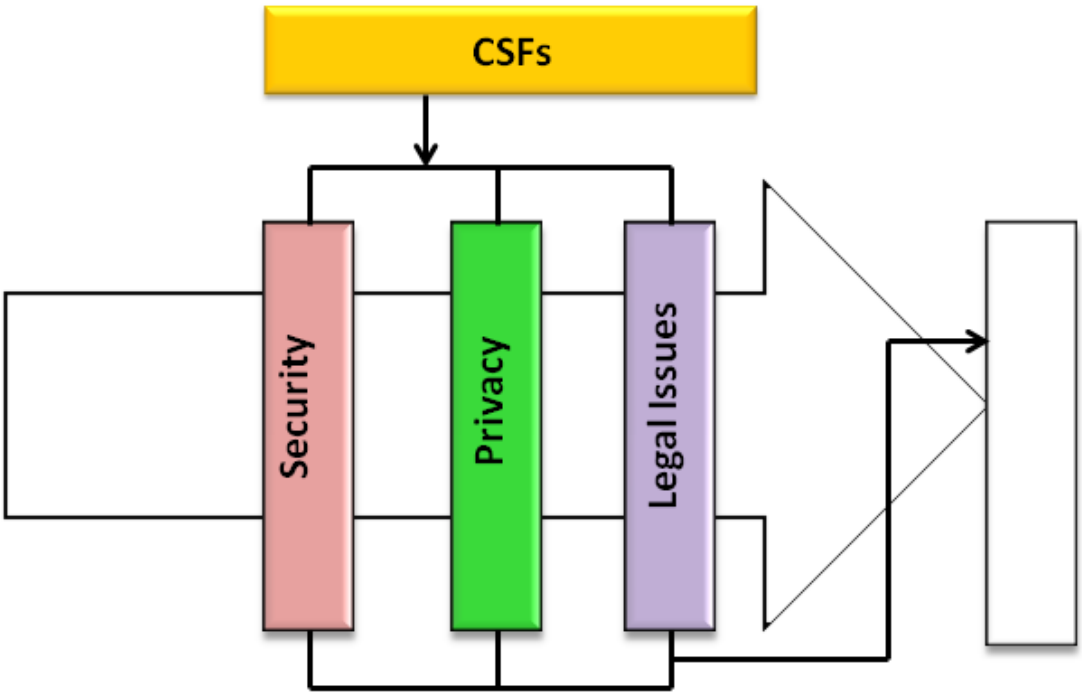

Figure IV-2. Legal issues as an essential component of Dynamic Multi-Agency Collaboration (DMAC).

4.3 THE NECESSITY OF TIMELINESS

Currently there is no clear, uniform structure defining the DPA and how its principles are to be carried out (Tranberg & Rashbass, 2004; DH, 2006). The principles of the DPA are just that – principles. They spell out minimum requirements and identify general principles to be considered. The DPA does not provide a complete solution to the problem of electronic medical and social care privacy on electronic records, nor can it clarify the confusion and disagreements which presently exist in interpreting the principles and deciding how health and social care records will be handled (Anderson et al., 2006).

This lack of clarity -- as well as the necessity of following a organisation's often cumbersome procedural protocols -- can result in delays of several weeks before a child and family in need are granted assistance.

Additionally, the Laming Report suggests what is necessary to protect children's confidentiality in the information sharing process (Laming, 2003), but the 108 recommendations resulting from the inquiry report are not prescriptive. Each organisation must satisfy itself, using in its own protocols for information sharing, according to the principles of Data Protection Act, as well as holding responsibility for the quality and accuracy of the information it provides.

4.4 THE NECESSITY OF AN INFORMATION SHARING FRAMEWORK

An information sharing framework, as previously stated, has been found to be vital for success in any information sharing venture between organisations (Halamka et al., 2005; Hill, 2006).

Penny Hill, in *Establishing a Framework for Information Sharing*, writes, "Historically, many organisations have collaborated in the production of joint Information Sharing Protocols. This work has generally resulted in the production of large, unwieldy documents, often with no real link to operational processes. The maintenance of these documents is time-consuming and complex...The delivery of these kinds of documents may meet certain criteria and give the organisations concerned ticks in a number of boxes, but the contents of these agreements are rarely implemented at the front line...An Information Sharing Framework, however, consists of a number of documents, each with a clear target audience, and each with a localised route for ensuring their review and maintenance. It can be developed over time, can support adaptations to take account of changes in the law or organisational restructuring, and ensure that the necessary details are accounted for in each information transaction" (Hill, 2006).

In consideration of confidentiality and electronic information sharing, a Taiwanese study provides one example. This study considered security and privacy in an Electronic Medical Record (EMR) system with an expert panel drafting a proposal of nine principles and twelve articles comprising Medical

Information Security and Privacy Protection Guidelines (Yang et al., 2006). These guidelines provided a frame of reference for national medical organisations in providing a confidential and secure environment for information sharing and other electronic transactions. The principles include:

1. Principle of minimum necessary. When medical organisations or their staff collect, use, or disclose medical information, or request medical information from another organisation or relevant staff member, the organisation or its relevant staff must make reasonable efforts to reduce the scope of collecting, using, or disclosing the medical information to the minimum as needed.
2. Principle of direct collection. When medical organisations or their staff collect medical information, they must do so from the patients or their legal representatives.
3. Principle of respect and notification. When the medical organisations and their staff collect, use, or disclose medical information, they must respect the patients or their legal representatives, and be attentive [to the fact] of whether [the patients have been informed of information processing and have disclosed personal information voluntarily].
4. Principle of equality and justice. The medical organisations and their staff cannot use unlawful or unjust methods to collect, use, or disclose medical information.
5. Principle of compliance with current laws. When medical organisations or their staff collect, use, or disclose medical information, they must comply with the current relevant laws and regulations.

6. Principle of maximum reasonable. The medical organisations that store the medical information must, under reasonable limits, make the best efforts to ensure the security of medical information [for as long as they hold that information].
7. Principle of protection of patients' rights. When medical organisations or their staff collect, use, or disclose medical information, they must protect patients' rights; in addition, the patients still maintain certain rights to their personal medical information stored in medical organisations.
8. Principle of non-disclosure. Medical organisations and their staff cannot disclose any medical information without the consent of patients.
9. Principle of protection of life and public interests. When medical organisations or their staff collect, use, or disclose medical information, they must do so in protecting life and public interests (Yang et al., 2006).

Some countries maintain complex legal requirements when sharing personal information. As an example of a legal requirements built into a framework, data security and protection were the subject of a 2003 study of Electronic Patient Records (EPRs) in Germany (van der Haak et al., 2003). The German legal framework includes requirements pertaining to the disclosure of health information in connection with the treatment of the patient. In addition to information sharing protocols among organisations, the legal requirements as well as the architecture of a secure system were built into the framework which is described in this cross-institutional study (van der Haak et al., 2003).

Frameworks in use by multiple organisations must include the general principles of an operational framework, but also any necessary governance, security, privacy and legal requirements. An effective way forward must be found in order to build common frameworks for information sharing, and to put Lord Laming's recommendations into practice. Providing immediate help for children is of utmost importance, as is protecting the confidentiality of children.

4.5 CONCLUSION

This chapter has addressed some of the barriers to effective information sharing. Firstly, it has considered the history of data protection and why there is currently confusion in carrying out the sharing of personal information according to Data Protection principles. Secondly, discussion has included the specific issues with data protection and the application of these issues to children's information. Additional barriers to effective information sharing were then identified. The issue of timeliness has been shown to be a major area of concern because valuable time is lost due to data protection complications. Any attempt by organisations to work together without a common framework was also shown to be a major barrier to effective information sharing.

The next chapter proposes Dynamic Multi-Agency Collaboration (DMAC), a model for information sharing which will apply best practice using Critical Success Factors (CSFs) and the socio-technical approach as described in the previous chapter. In addition, DMAC positively addresses the barriers to effective information sharing identified in this chapter and resolves many issues

related to data protection and timeliness, as well as providing operating frameworks for organisations. DMAC argues to be a breakthrough for more effective information sharing among organisations because it is built upon a solid infrastructure of business and technical frameworks for effective information sharing, and solidly underpinned by its timeline.

Chapter Five: Dynamic Multi-Agency Collaboration

5.1 INTRODUCTION

The previous chapters have discussed some of the elements necessary for effective information sharing as well as concerns about data protection and other barriers to effective information sharing among organisations. The discussion now turns to one solution for key areas of the information sharing dilemma. Dynamic Multi-Agency Collaboration (DMAC) is a theoretical model designed to address problematic areas of information sharing including data protection, timeliness, and the necessity of an information sharing framework. This chapter will explain DMAC and its timeline which underpins and supports information sharing among organisations.

The timeline is at the heart of the DMAC model and is inherent in the dataset, i.e., urgently needed data which is gathered from electronic records in various organisations. The dataset is constrained by a small window of time in which a social worker or other practitioner has the information s/he needs to act to help a child and family. After a certain period of time, this window is closed and the information on the dataset dissolves. The addition of a timeline gives more control to data providers and supports information sharing, which, in turn, encourages data sharing within the legal terms of the Data Protection Act 1998. It is the limited life of the dataset which empowers organisations to share data from its records with confidence.

The existence of this dataset is upheld by the business and technical frameworks for information sharing, which are in turn are supported by the

DMAC alliance. It is this overseeing body which holds the authority to define all business and technical functions necessary for information sharing.

This discussion begins with a short description of a typical series of events which could occur in the life of a vulnerable child over a ten day period. Subsequently, the process of helping the child and family is described both in current practice and then contrasted using the DMAC system. A technical discussion of the DMAC model is then described, demonstrating that DMAC is upheld by the timeline and its limited-life dataset. Further discussion explores DMAC, its frameworks, alliance, evaluation using socio-technical (ST) criteria, and its limitations.

5.2 EVENTS SURROUNDING A VULNERABLE CHILD OVER A TEN DAY PERIOD

In this scenario based on real events, a child has received services from several organisations, i.e., a GP surgery, a school, and a hospital. During this series of events, someone has telephoned a children's social care agency to refer a child the caller believes is in need of help. The social worker who receives the telephone call begins his/ her attempt to obtain more information from other organisations regarding the child and family. In the series of events given in Table V-1, the organisation involved is listed along with the resulting event, including any entry made on the child's record in the organisation's information system. The calendar in Figure V-1 summarises this scenario.

Item	Date	Organisation involved	Notes, including entries on child's record
1	8 Jun	GP surgery. Father takes child to GP surgery where child is registered	Dr X examines child, completes a health record, including date of birth, address, and health status which states that the child's health is good and is consistent with normal growth and development for her age
2	14 Jun	School. Child acts anxiously and has stomach ache; lies down in the sick room; cries, appears downcast and frightened.	Mrs Y, sick room monitor, records child's illness on record
3	15 Jun	School. Mrs P, school secretary, notes child is absent;	Child's first absence added to school record
4	17 Jun	Telephone referral. Child's neighbour, Ms A, calls children's services; Ms SH, children's services officer, takes the call	Ms A calls to register concern for the child's health and wellbeing; she gives child's name and address
5	18 Jun	Children's services. Ms SH refers to her supervisor, Ms BP, for action; Ms BP checks client database, accessing all possible fields (name, address, date of birth, etc)	Ms BP finds no record in the client database, so she creates a new record
6	18 Jun	Children's services. Ms A, social worker, has been assigned to the child's case; she performs the necessary functions for an unannounced home visit; Ms A uses the address from the telephone referral	No one is found to be at home, but neighbour says they have not moved away; Ms A records attempted visit on child's record

7	18 Jun	School. Mrs P notes child has been ill on Monday and absent from school daily since Tue; mother has not called to confirm absence; repeated phone calls to mother are unsuccessful; Mrs P is concerned and notifies children's services	Child's record shows illness on Monday and absent from Tuesday onward; repeated attempts to contact mother are unsuccessful
8	18 Jun noon	Hospital. Ms AV, neighbour, sees the child's injuries and signs of possible abuse; she takes child to hospital	Dr RB, senior house officer, takes the child's history from Ms AV; Dr RB includes in his notes that there is a strong possibility of non-accidental injury
9	18 Jun after-noon	Hospital. Dr RB refers child to Dr EAO, paediatric registrar, because of possibility of non-accidental injury	Dr EAO gives child a detailed and thorough examination, and writes up detailed examination notes, including a body map with the description of suspected non-accidental injuries
10	18 Jun after-noon	Hospital. Dr EAO, following hospital protocol, notifies Dr S, the hospital's named doctor for child protection; Dr S advises Dr EAO to admit the child and notify children's services, which she does	Hospital record shows child is admitted
11	18 Jun 4.30 pm	Children's services. Ms BP, upon returning to her office after a meeting, is notified that both the school and the hospital have called regarding a child	Ms BP checks the client database, and sees the record that she created on 18 June and adds the two telephone referrals; child's record now shows child's contact details (as related from the neighbour) with the three telephone referrals: neighbour, school and hospital
12	18 Jun 4.30 pm	Children's services. Ms BP has concerns for the child and telephones the school, but all school office personnel have gone home for the weekend	Ms BP cannot gather any further information from the school until Monday

13	18 Jun 4.40 pm	Children's services. Ms BP telephones the hospital and is told the evening rounds doctor will call her back; she voices her concerns to be relayed to the doctor	Ms BP cannot gather any further information from the hospital at this time
14	18 Jun 4.50 pm	Children's services. Ms BP relays her concerns to the weekend emergency duty team and goes home for the weekend, resolving to begin to gather the needed information on Monday	Child and family will be waiting for assistance until next week, at earliest

Table V-1. Ineffective information sharing: a social worker is unable to access urgently needed information.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	1	2	3	4	5	6
7	8 Registers at GP surgery	9	10	11	12	13
14 Sick at school	15 Absent from school	16 Absent from school	17 Telephone referral Absent from school	18 Taken to hospital; later admitted Absent from school	19	20
21	22	23	24	25	26	27
28	29	30				

Figure V-1. Calendar of events involving a vulnerable child.

5.3 INFORMATION SHARING: CURRENT PRACTICE

Acting upon a referral that a child needs help, a social worker or practitioner typically will need more information about the child and family during an assessment process. In order to provide knowledgeable assistance, the social worker may want to know if the child has visited the GP and has had any illnesses or injuries. The social worker may likewise want to know if the child has been hospitalised recently, and if there are any injuries which might be consistent with abuse or neglect. It may be that the social worker wants to know if the child has been absent from school. It may be such a situation that the social worker decides a strategy meeting is in order, and so sets in motion a tentative meeting to be scheduled at a certain time.

Many times, the social worker telephones other organisations, possibly with contact names in these organisations s/he tries to reach; s/he is hopeful she can reach the contacts in the other organisations, that the person is in the office, working that day, and available to speak on the telephone. This is a multi-step process whereby a social worker rings the GP, the hospital doctor and the school officer, each in turn. S/he speaks to each person separately for information. The recipient of social worker's call typically consults files for requested information. S/he may need to drop by and drop off a file or arrange for the file to be picked up. Or the social worker may need to arrange for a strategy meeting with multiple participants, if necessary. Putting together an informed plan to help the child and family is often not possible until the social worker is satisfied s/he has all the needed information from various

organisations to make a knowledgeable decision. Figure V-2 illustrates this multi-step process.

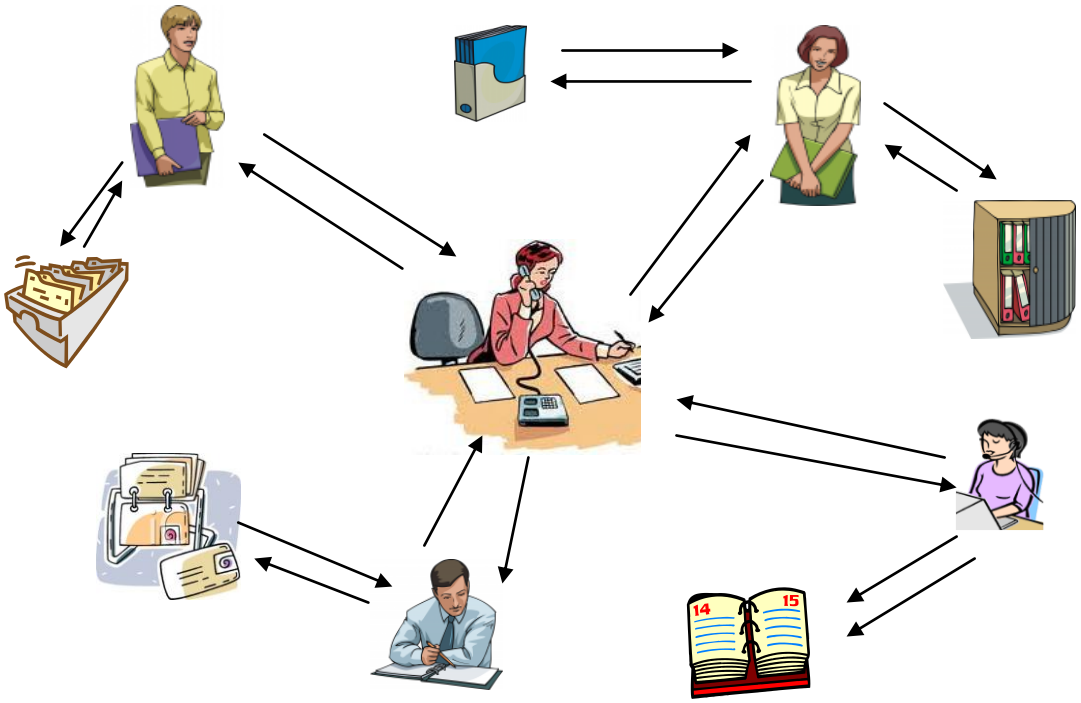

Figure V-2. Ineffective information sharing: multi-step process of a social worker obtaining relevant information from multiple resources.

5.4 INFORMATION SHARING: DMAC WITH THE TIMELINE

In the new way of working with DMAC, however, the social worker does not need to telephone various organisations in order to request information or attempt to schedule a meeting. When a social worker needs information from other organisations to form a plan to help the child and family, using DMAC s/he will be able to extract immediately the necessary information from relevant portions of the child's record residing in the GP surgery, hospital, or school. Table V- 2 illustrates in a new scenario.

Item no.	Date	Organisation involved	Notes, including entries on child's record
Item nos. 1-11		same as Table V-1	Children's service record shows child's contact details (as related from the neighbour) with the 3 telephone referrals: neighbour, school and hospital
12 DM AC	18 Jun 4.30 pm	Children's services. Ms BP has concerns for the child; because she is a vetted specialist in multi-agency collaboration, she uses DMAC and places an online request for the child's complete record, the parts of which have been approved for sharing by the organisations involved. Her request is approved and the DMAC dataset is created and will be available for 10 days, the current period of time approved by DMAC alliance of organisations.	Using DMAC, Mrs BP accesses child's complete record which now includes relevant information from GP, school, and hospital -- having been entered on the child's electronic record in each organisation: 1. Children's services details as above 2. GP's record which shows different address for child, which appears to be the father's 3. School details, with child's illness and absences; same address as GP 4. Hospital record, including child's history, and both doctor's notes with possibility of non-accidental injury, examination notes, and body map with the description of suspected non-accidental injuries
13 DM AC	18 Jun 4.50	Children's services. Ms BP is now fully informed of all the child's details because she has seen a complete record and has a complete picture of the child's situation; she takes immediate and appropriate action, and creates a knowledgeable plan.	Because of more information available, a more appropriate plan is produced more quickly.

Table V-2. Effective information sharing: a social worker is able to immediately access needed information.

In the traditional way of working, Mrs BP, the social worker seeking to obtain information, is unable to gather the child's information from the other organisations on the day she needs it; therefore, she remains uninformed and any assistance given to the child and family is based on a limited amount of knowledge which may be, as a result, insufficient or inappropriate. Subsequent days or weeks are spent in information gathering.

Using DMAC, however, Mrs BP is able to obtain the information she needs immediately. When she has the complete picture of the child's situation, she can make a plan based on fuller knowledge which is, therefore, likely to be more appropriate to the child and family. An intervention or any other action taken will be more appropriate and more efficient because the social worker is well-informed, with all the information immediately available.

Using DMAC, the information s/he receives from the organisations is in the form of a dataset which has a limited lifespan. The expiration date of the limited-life of the dataset, has also been previously agreed upon by all organisations. Since this dataset will disappear at an appointed time, there is no permanent record created and the organisations' integrity of records remains intact.

Figure V-3 illustrates the information sharing process from the view of the social worker. The social worker queries DMAC and immediately obtains all the needed information. The displayed results exist for the appropriate amount of time, then disappear according to the agreed dataset lifespan.

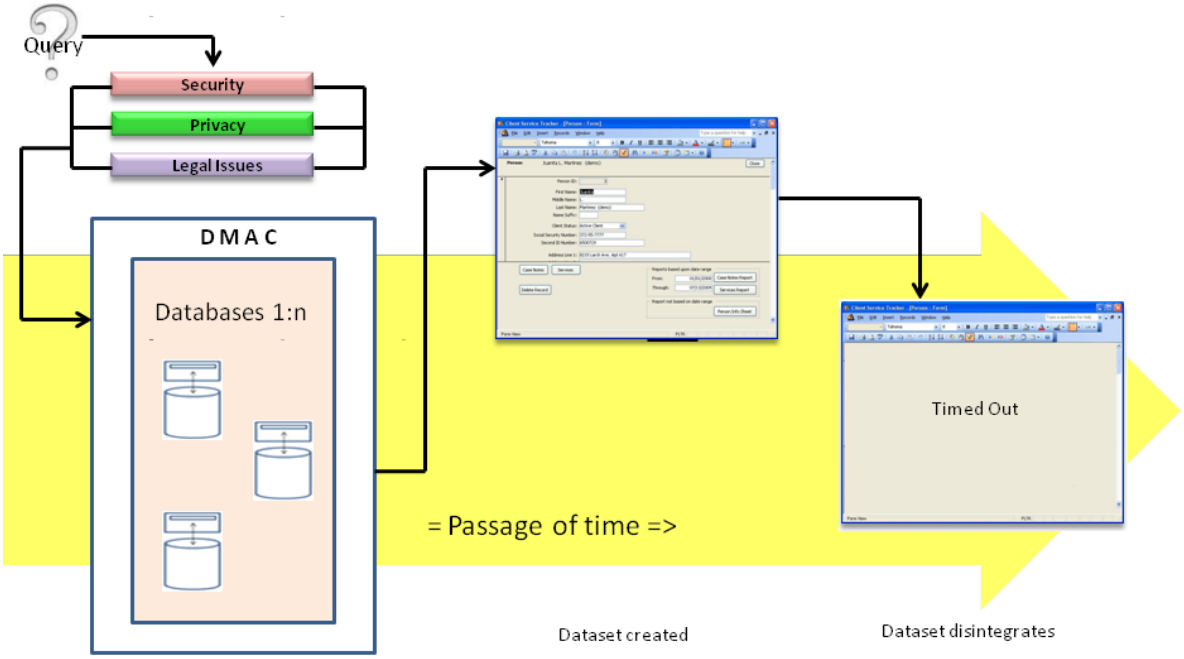

Figure V-3. Effective information sharing: social worker's query results in a dataset of needed information immediately, followed by the disintegration of the dataset at the appropriate time.

Existing protocol according to DMAC frameworks define precisely how long the temporary dataset will exist. When the shelf-life of the dataset has expired, the dataset dissolves. The DMAC Timeline is illustrated in Figure V-4, showing the limited life of the dataset.

DMAC Timeline

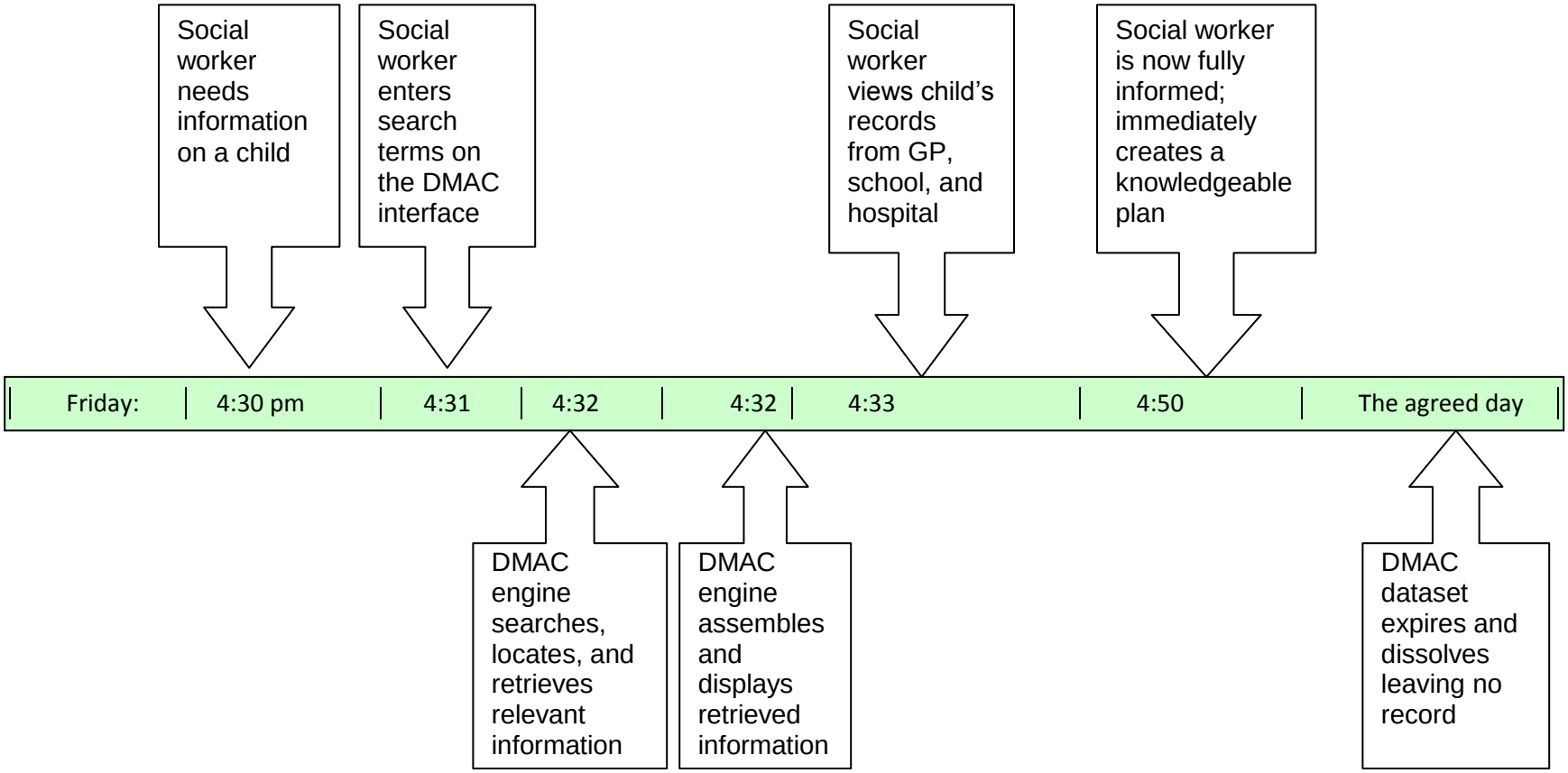

Figure V-4. DMAC Timeline illustrating that the social worker with is able to obtain urgently needed information immediately.

It is important to distinguish between the DMAC process of producing the limited-life dataset, and the resulting content. In any group of organisations which share information, the dynamic working must remain separate from its application. In other words, the DMAC information sharing dataset from a social worker's request is distinct from how the social worker will be using the content of the dataset. It is outside of the scope of this thesis to attempt to regulate organisations' use of information either inside the information system (for example, in evidence for care proceedings under Section 31 of the Children Act 1989), or once it has been gathered together forming the DMAC limited-life dataset.

It is the timeline, however, which is at the heart of the DMAC model and is inherent in the process of effective information sharing. The addition of a timeline gives more control to data providers and supports information sharing, which, in turn, encourages data sharing. Figure V-5 illustrates the various components of the DMAC model and the DMAC timeline, which underpins the information sharing process.

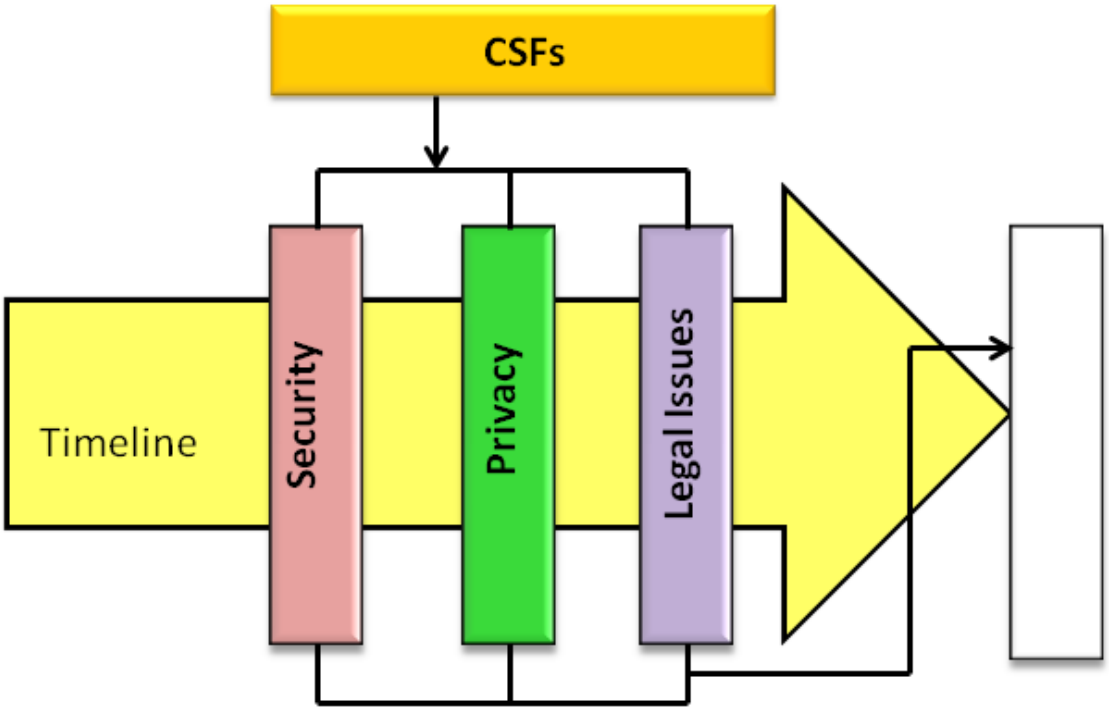

Figure V-5. The timeline underpins the process of information sharing in the DMAC model.

5.4.1 The DMAC Model

As discussed in the previous chapters, Dynamic Multi-Agency Collaboration (DMAC) involves several key elements, in particular Critical Success Factors (CSFs) which contribute to the components of security, privacy, and legal issues as discussed in previous chapters. The timeline underpins the process which culminates in effective information sharing using DMAC. Figure V-6 illustrates the complete information sharing process with the major components of DMAC.

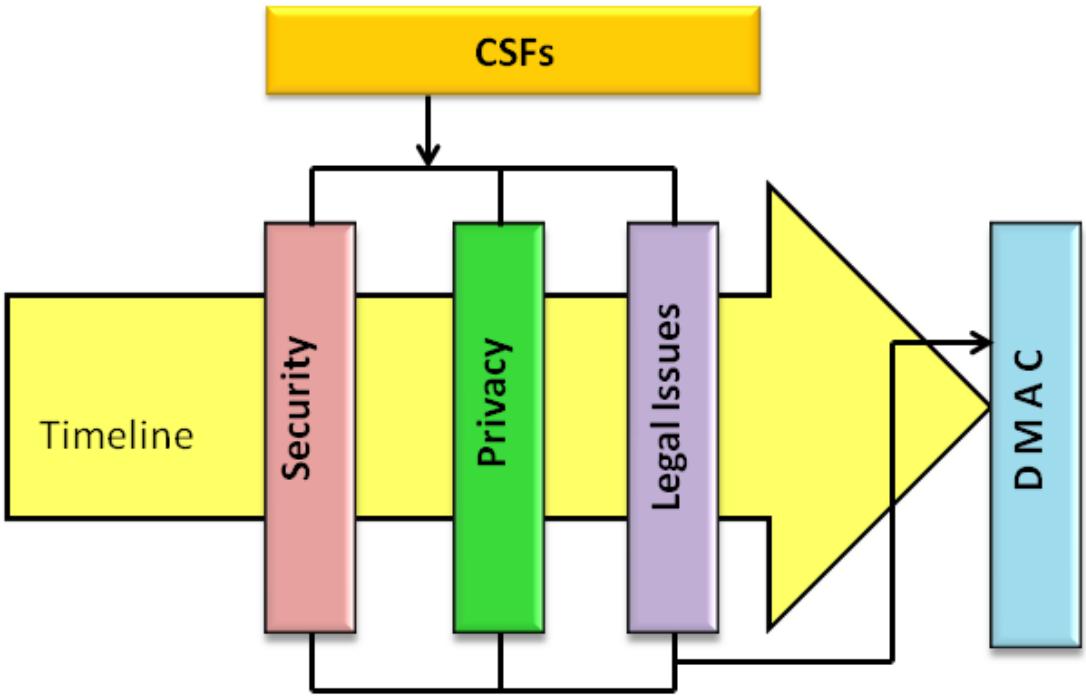

Figure V-6. The complete DMAC information sharing process.

5.4.2 Technical discussion

The DMAC process of assembling a temporary dataset consists of several elements: 1. Searching, locating, and retrieving the required information from organisational databases such as those of a hospital, GP surgery or a school 2. Assembling and displaying a temporary DMAC dataset and 3. Ensuring the dataset dissolves at the expiration time. Each of these elements makes use of existing database technology.

One way in which searching, locating, and retrieving needed information from the disparate databases of organisations could be handled would be by the use of Information Extraction (IE). IE attempts to "extract from the documents (which may be in a variety of languages) salient facts about prespecified types of events, entities or relationships. These facts are then usually entered automatically into a database, which may then be used to analyse the data for trends, to give a natural language summary, or simply to serve for on-line access" (GATE, 2010). Information extraction can be used to retrieve both structured and unstructured information from relevant records residing in different organisations' databases (McCallum, 2005). Depending on the goal of the IE task, the process can be subdivided into subtasks such as segmentation, classification, association, normalisation, and deduplication (McCallum, 2005).

As an example, the medical insurance group, Verity (USA), extracts semi-structured information through fields in a form in which information has been summarised (McCallum, 2005). Using DMAC, one option for IE from personal records held in a GP surgery, hospital, or school could be a process which would automatically generate an XML file for each personal record held in an organisation upon its creation or edition. Figure.V-7 illustrates a simplified example of a hospital XML record.

```
<child>
<child unique id>1234567</child unique id>
        <name>
                <firstname>Joseph</firstname>
                <middlename>Roberts</middlename>
                <surname>Jones</surname>
        </name>
        <address>
                <street number>1059</street number>
                <street name>Princes St </street name>
                <apt number>17</apt number>
        </address>
        <services provided this visit>
                <enter date>18/06/2010</enter date>
                <exit date>19/06/2020</exit date>
                <provider>Dr. Smith</provider>
                <service type>
                        <blood test>XYZ</blood test>
                        <blood pressure check>120 / 80</blood pressure check>
                        <physical examination> …</physical examination>
                </service type>
                <child protection concerns>
                        <item1>suspicion of non-accidental injury by Dr Jo</item1>
                        <item2>suspicion of non-accidental injury by Dr Ng</item2>
                </child protection concerns>
        </service provided this visit>
</child>
```

Figure V-7. A simplified example of a hospital XML record.

It is beyond the scope of this thesis to tightly define all the functionality of the IE process within DMAC. Whether or not IE using XML records would be appropriate, whether a particular metadata scheme would be introduced to summarise each personal record, etc – these are examples of decisions which would be made by the DMAC alliance of organisations, explained more fully later in this chapter.

The healthcare field is already using IE systems which have been designed to summarise medical patient records by extracting diagnoses, symptoms, physical findings, test results, therapeutic treatments, etc (GATE, 2010). The many options available for the working of IE and these would be worked out among the organisations based on their agreements with each other for collaborative working.

The second step in the DMAC process, assembling and displaying a temporary DMAC dataset, can be considered as an end process of an IE transaction. For example, in a price comparison website, such as a website used to compare car insurance, the user enters information which is known, such as the make and model of car to be insured, car registration number, age and address of driver, etc. Just as the comparison shopper has entered known criteria for a car insurance quotation, the practitioner using DMAC enters known information regarding the child, such as surname and variations, aliases, parents' details, all addresses known, etc. The information requested by a practitioner using DMAC would be displayed similarly to the information displayed on a price comparison website. Figure V-8 shows an example of a screen shot display of a car insurance price comparison website.

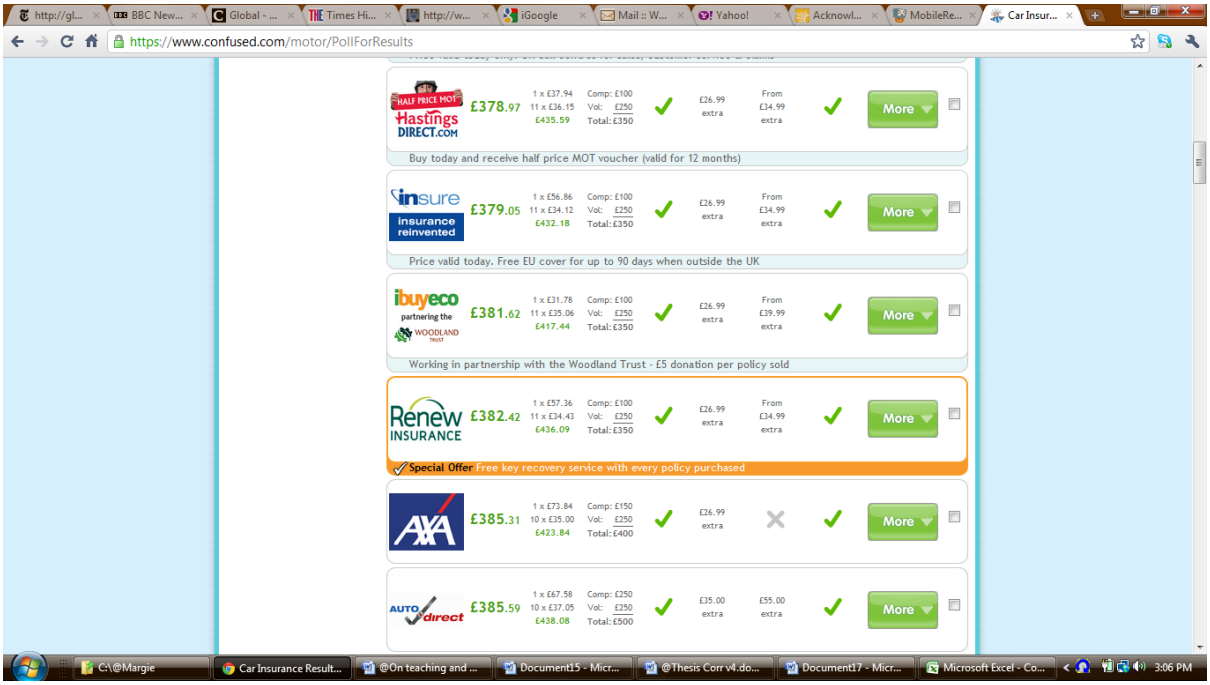

Figure V-8. Example of a car insurance comparison website, where requested information from multiple databases is displayed.

The third part of the DMAC process, ensuring the dataset dissolves at the appropriate time, is also based on existing technology; ebooks are one example. When an ebook is "checked out" of a library, that ebook is available on the user's ebook reader for a specified period of time, such as 28 days after downloading. When the expiration date arrives, the book is no longer available to be read on the user's reader. This expiration date is usually set by the ebook license-holder. Similarly, the DMAC dataset displaying relevant information regarding the vulnerable child has a limited life and will expire at a time agreed by all organisations involved, e.g., ten days (or twenty-four hours, or whatever time period is agreed upon). When the expiration time arrives, the dataset dissolves and is no longer available to be viewed.

5.4.3 DMAC business framework

Chapter four included a discussion of organisations' lack of a common framework for information sharing as a barrier to collaboration and has shown that the necessity of frameworks for effective information sharing is well-established. The DMAC functionality is solid because it is upheld by the DMAC business and technical frameworks.

In order for DMAC to be implemented, there are necessary business requirements in order to operate. These items are contained in a common framework. Examples of items in a business framework might include:

- Each institution must maintain an information system according to the DMAC framework specifications as well as its own requirements.
- All personal data collected should be accurate and complete, maintaining data integrity and quality.
- Protocols of data protection and confidentiality are to be maintained as the organisations themselves have defined them, as well as protocols in other areas.
- Staff is well-trained, appropriate to role, in the organisational software, collection and maintenance of patient/ client records, protocol of data protection, and any other specific requirements.
- The time agreed for the life of the dataset before it expires and dissolves.

5.4.4 DMAC technical framework

In addition, there are technical functions, such as record and database requirements. Examples might include:

- Each organisation must hold a record on each patient/ client.
- An XML record must be automatically generated for each record in the organisation's information system and must contain prescribed fields according to the framework.
- Developers must adhere to DMAC guidelines so each record is structured according to specific items in specific fields of information.
- Any hardware or software can be used in an organisation, provided it conforms to the agreed technical framework and its essential requirements.
- Robust security as maintained throughout.

5.4.5 The alliance of DMAC organisations

Participating members of the information sharing network must belong to and comply with the agreements of the alliance of DMAC organisations. The DMAC alliance is local, comprised of the group of organisations which will be sharing information. The alliance oversees the business and technical frameworks, with a standing committee as the regulatory oversight group.

The general functions of a DMAC alliance are outlined below within the structure of Cherns' original nine principles of socio-technical design (Cherns, 1976). These principles were introduced in chapter two, Table II-1. Note that it is not the purpose of this thesis to rigidly define or strictly delineate all responsibilities of the alliance, but rather to describe some of its functions in relation to effective information sharing.

Socio-technical Principle #1 (ST1) Compatibility: Design with the objective in mind and the competencies required to meet them. Lord Laming's Inquiry Report has identified many of the competencies required for information sharing among agencies in order to keep children safe (Laming, 2003). Working with objectives such as keeping children safe, the standing committee's oversight follows an "emergent strategy," a pattern of action the specifics of which develop over time while working within the principles of a framework (Mintzberg & Waters, 1985). Because the business and technical frameworks are in place and the competencies present, a "planned strategy," where all details are meticulously planned out in advance, is unnecessary and inadvisable (see ST2).

ST2 Minimal Critical Specification: Identify the essential and do not specify more than is absolutely essential. Because organisations vary a great deal, the alliance preserves an effective framework of the information sharing process and the components which comprise the process. Each local alliance adapts the information sharing framework to meet its own needs.

ST3 The Socio-Technical Criterion: Variances are unprogrammed events; if they cannot be eliminated, control them as near to the point of origin as possible. Unprogrammed events are unavoidable, and the standing committee recognises that organisations themselves are in the best position to take responsibility and elimination/ control as necessary. The alliance monitors variances and elimination/ control outcomes and steps in to add support when necessary.

ST4 The Multifunctional Principle: Organism vs Mechanism: Takes into account that the same function can be performed in different ways by using different combinations of elements. Equifinality states that a given end state can be reached by many potential means and the same function can be performed in different ways by using different combinations of elements. Stated more simply, there are several routes to the same goal. Recognising equifinality is one of the greatest strengths of the existence and function of the alliance. Rather than overspecify what must happen and rigidly control information sharing rules, the alliance allows each organisation to reach the objectives of effective information sharing (see ST1) in the way which best fits the organisation.

ST5 Boundary Location: "Frontline" members of an organisation co-ordinate and manage their own boundaries, or work areas, in their own departments as they are the ones who best know the work activities and what is required to successfully perform them; de-centralised control. Related to ST4, practitioners in organisations use the established business and technical frameworks and work to meet agreed objectives.

ST6 Information Flow: Information systems should be designed to provide information initially to the point where it will be directly needed. An organisation's information system can "supply a work team with exactly the right type and amount of feedback to enable them to learn to control the variances which occur within the scope of their spheres of responsibility and competence… " (Cherns, 1976). When an organisation's information system needs to be adjusted due to growth, outdated technology, or other factors, the alliance supports the organisation, untangling necessary issues so the information sharing process remains effective.

ST7 Support Congruence: Systems of social support should be designed so as to reinforce the behaviors which the organisation structure desires. According to Cherns, an organisation's philosophy and the actions of the management should be consistent (Cherns, 1976). In addition to information systems, organisations' systems of conflict resolution, work measurement, performance assessment, etc, all need to reinforce the business and technical frameworks.

ST8 Design and Human Values: The design of the organisation should be to provide a high quality of work. Uniformly defining the term "work" and also the notion of "high quality" are arguably not possible given their subjectivity. Over three decades ago, Emery (1978) assert six basic characteristics of a good job which are relevant today. They consist of the need by the employee for:

- An optimal level of variety.
- Learning opportunities.

- Scope for making decisions.
- Organisational support – training, good supervision, etc.
- A job recognised as important by the outside world.
- The potential for making progress in the future (Emery, 1978).

The DMAC alliance is built on this socio-technical theory which recognises the worker is of great value and is an integral component in system design consisting of the worker and the tasks s/he performs which is supported by technology. In health and social care, the practitioners are the experts and it is of utmost importance to address the necessity of meeting practitioners' needs which results in a high quality of work.

ST9 Incompletion: The multifunctional, multilevel, multidisciplinary team required for design is needed for its evaluation and review. According to Cherns (1976), "as soon as design is implemented, its consequences indicate the need for redesign" (Cherns, 1976). Because change is constant, the alliance monitors areas of adjustment needed in the organisations and guides in the management of change.

In summary of the above socio-technical principles, the DMAC alliance oversight:

- Ensures through consistency that pre-defined protocols which form the information sharing business and technical frameworks will apply to all organisations and possible situations.
- Reviews and reconciles differences as they arise.

- Addresses continuing issues.
- Engages in conflict resolution.

Thus far the discussion has been concerned with the functioning of the Dynamic Multi-Agency Collaboration (DMAC) and how the dataset, frameworks, and alliance are structured, contrasting traditional ways of working which may prove time-intensive with the DMAC process in which information is gathered immediately. The next section will further discuss and evaluate DMAC and discuss some of its limitations.

5.5 DISCUSSION: EVALUATION OF DMAC USING THE ST/ CSF STRUCTURE

Recalling the evaluation criteria from chapter three, the discussion now focuses on the socio-technical (ST) criteria used for evaluation, those of system design and professional concerns. The evaluation points which have been used to consider ContactPoint socio-technically in section 3.3 are now applied to DMAC.

It is important to note that DMAC is a component of a ST IOS; it is not a complete IOS in itself. As such, not all evaluation points are applicable to DMAC.

1. Approach: Socio-Technical (ST) or Top-Down. DMAC uses a ST approach at several levels. In the broadest sense, DMAC relies on the ST design of the IOS, and presumes that there is the necessary user input within each IS design which comprises the IOS. It is the organisations which decide what information will be

shared, under which circumstances and with which other organisations. It is also the organisations which decide on data protection procedures and how consent will be handled. DMAC works in accordance with the organisations, upholding each organisation's protocols for information sharing. More specifically, the organisations determine how long will be the life of the dynamic dataset before it disintegrates, as well as other details relating to DMAC.

In addition, DMAC makes use of the alliance of organisations, the leadership and oversight group comprised of professionals from stakeholders themselves with expertise in diverse areas. In this way, the alliance is not overseeing from the top looking down, but rather from an integrated, user level.

2. Led by Technology or People. Although DMAC uses technology to carry out information sharing tasks, it is the organisations and the users who have made the supporting decisions underlying the use of technology. The organisations have built the frameworks for information sharing, and it is the frontline professionals who use the technology as a tool to carry out their work.

3. Users contribute input into system design. The ST principles which DMAC follows ensure the users contribute into system design. Both the alliance and the cross-organisational implementation and training teams are comprised of representatives of each of the organisations, both at the frontline and managerial levels.

4. Competing interests of stakeholders. DMAC is not a software solution, but rather a defined model and way of working among organisations sharing personal information. Although there may be politics involved which is typical of any organisation, DMAC is a defined model and, as such, there is little room for outside stakeholders to advance their proprietorial applications.

5. Flexible specification. A key element of ST design is flexible specification. Within the key requirements of the DMAC model resides space for flexibility where the individual practitioners, along with the organisations to which they belong, decide how they will meet DMAC requirements. This upholds ST design directly, that "whilst the ends should be agreed and specified, the means should not" (Clegg, 2000). Henry Mintzberg, a specialist in the field of ST principles in business and management strategy, sets forth two opposing polar strategies organisations can use for implementing a new process. A planned strategy usually describes a pattern of action which is planned and covers every point completely, with all details specified; an emergent strategy is a pattern of action that develops over time in an organisation (Mintzberg & Waters, 1985). Using a combination of these strategies, "organisations ...[may] pursue ... umbrella strategies: the broad outlines are deliberate while the details are allowed to emerge within them" (Mintzberg & Waters, 1985). It is this idea of flexible specification of which DMAC makes use: the alliance, as well as other administration operate under the outline of the information sharing frameworks, while working with the issues which emerge over time.

6. Trust among stakeholders. Trust among stakeholders is assumed within the DMAC model and build into the first and foundational CSF1: strong motivation based on trust is essential to gain and guarantee commitment from the organisations involved (Lu et al., 2006).

Some of the areas of professional concern are outside of the DMAC model. Because DMAC works with the information sharing guidelines which the organisations have decided, articulated and implemented, it is outside of DMAC's sphere of activity to further regulate or over-specify. DMAC, true to ST design, leaves professional concerns to the professionals involved. Although the alliance will be maintaining and overseeing the collaboration according to the information sharing frameworks and acting according to highest professional principles and best practice, it is the organisations which undertake the responsibility of sorting out e-discrimination, effectiveness of social interventions, interpretation of data protection law, and all that is involved when protecting children and families along with access and security issues.

5.6 DMAC LIMITATIONS

There are a number of limitations in any theoretical model design, and DMAC is no exception. In particular, some manual, case-by-case processing will still be needed when organisations share information. In the report by Lord Laming resulting from the Victoria Climbié Inquiry, Lord Laming cites three types of situations where he recommends face-to-face discussions (Laming, 2003). It is

acknowledged that using the DMAC model there will always be special instances which need to be identified on a case-by-case basis where it is not appropriate to share information electronically, and where face-to-face information sharing is expected.

Examples of Lord Laming's recommendations:

- Recommendation 67 states, "When differences of medical opinion occur in relation to the diagnosis of possible deliberate harm to a child, a recorded discussion must take place between the persons holding the different views. When the deliberate harm of a child has been raised as an alternative diagnosis to a purely medical one, the diagnosis of deliberate harm must not be rejected without full discussion and, if necessary, obtaining a further opinion."
- Recommendation 69 states, "When concerns about the deliberate harm of a child have been raised, a record must be kept in the case notes of all discussions about the child, including telephone conversations. When doctors and nurses are working in circumstances in which case notes are not available to them, a record of all discussions must be entered in the case notes at the earliest opportunity so that this becomes part of the child's permanent health record."
- Recommendation 80 states, "When a child for whom there are concerns about deliberate harm is admitted to hospital, a record must be made in the hospital notes of all face-to-face discussions (including medical and nursing

"handover") and telephone conversations relating to the care of the child, and of all decisions made during such conversations. In addition, a record must be made of who is responsible for carrying out any actions agreed during such conversations" (Laming, 2003).

5.7 CONCLUSION

As discussed in this chapter, DMAC is a model which uniquely supports effective information sharing. DMAC utilises the best practices of the socio-technical approach and critical success factors of an inter-organisational system. DMAC effectively addresses the barriers to effective information sharing, those of privacy, confidentiality, data protection, and timeliness supported by business and technical information sharing frameworks.

Most importantly DMAC is underpinned by a timeline to the life of the data held on the temporary dataset. After the period of time agreed by all stakeholders has been achieved, the shared data dissolves. It is this limited-life dataset which gives more control to data providers, and would encourage them to more readily share information, knowing that this sharing would be within the legal parameters of the Data Protection Act.

In this chapter, a technical discussion of DMAC has been illustrated in terms of current database technology: searching, locating, and retrieving the required information from organisations, assembling and displaying a temporary dataset,

and ensuring the dataset dissolves at the appropriate time. Following this illustration, a description of the timeline which underpins the DMAC information sharing model has been given. Lastly, a discussion which included a socio-technical evaluation was applied to the DMAC model with limitations of the model also included.

The next chapter reports on an interview study involving IS/ IT specialists who have provided some external validation which, in their opinion, confirms that DMAC can achieve its claimed benefits in overcoming barriers to information sharing.

Chapter Six: The Interview Study

6.1 INTRODUCTION

The last chapter introduced and discussed Dynamic Multi-Agency Collaboration (DMAC), the information sharing model underpinned by a timeline which makes use of a limited-life dataset. The discussion included a typical series of events which included health and social care interactions in the life of a vulnerable child. Responding to these events is described both in traditional ways of working, and also using the DMAC model. The technical discussion followed, detailing how DMAC would work using existing database technology. Lastly, a socio-technical evaluation of DMAC was included, using the same criteria as used in chapter three when evaluating ContactPoint.

This chapter discusses an interview study in which IS/ IT specialists were contacted in order to provide some external validation for and critique of the DMAC model.

6.2 THE INTERVIEW STUDY

Relevant external views about DMAC were sought via interviews with local IS/ IT specialists involved with sharing information collaboratively among organisations. The specialists were interviewed and their assessment of DMAC sought. They were asked whether DMAC could function as claimed, and whether it could achieve its claimed benefits in terms of overcoming barriers to information sharing, i.e., whether the addition of a timeline to the limited life of the dataset would further

support the information sharing process, overcoming barriers to information sharing such as data protection concerns..

In order to explore the claims made by the model Dynamic Multi-Agency Collaboration (DMAC) and the feasibility of its implementation, five Information Technology (IT) specialists representing different roles and responsibilities within key organisations were interviewed. Represented are organisational areas of health and children's social care, along with areas of expertise in data protection, legal agreements and protocols, data archiving and retrieval, privacy impact, electronic patient records, electronic social care records, the Common Assessment Framework (CAF), integration of health and social care, and information sharing among children's service organisations.

The specialists who agreed to be interviewed were:

1. A special projects manager from the NHS who is standardising the NHS Summary Care Record (SCR) in a two-county area in preparation for future interoperability with the Electronic Social Care Record (ESCR). [hereafter referred to as the respondent from the NHS, or rNHS]
2. A special projects manager who is working jointly between the NHS and children's Social Care in a two-county area. He is working on integrating the Common Assessment Framework (CAF) into health and children's Social Care organisations. [rNHS/SC]
3. An information sharing manager in children's Social Care in a city council. [rSC]

4. A local authority data specialist in a city council specialising in data archiving, retrieval, and privacy impact assessments. [rLAD]
5. A local authority legal specialist in a city council, with responsibilities for protocols, agreements and legal requirements. [rLAL]

The interviews sought to obtain the views of a variety of specialists providing IT expertise, to ascertain whether the points of view expressed on electronic information sharing were consistent with and complementary to the others' views, or if they were different from and contradicted them. Further, the interview sought to find if the respondents found the DMAC model to be technically sound and workable, whether any aspects of DMAC should be changed, whether the limited-life dataset would overcome observed resistance of sharing information, and whether the organisation represented by the respondent could foreseeably adopt the DMAC model.

The interview process proceeded as follows. The above five agreed to an interview and, several days before the interview date, were sent an information sheet via email attachment with an explanation of the research in which they were participating, along with a description of DMAC (see Appendix B). They were each interviewed for thirty minutes, and the researcher asked each respondent nine questions (see Appendix C) and made contemporaneous notes during the interview.

After the interviews with the respondents giving their answers and points of view, the researcher examined the responses. The researcher then tallied the quantifiable items and also looked for common themes from the respondents' answers. After the common themes were identified, the researcher used these themes in order to analyse the responses overall. There were common themes identified within part one, the first six questions of the interview pertaining to the respondent's engagement in the information sharing process, and also within part two, the remaining three questions.

6.2.1 Part One: Engagement in the actual information sharing process

Terms such as *information sharing* and *multi-agency working* are common terms but may be thought of as meaning quite different matters among the different organisations and also among the different roles within an organisation. Questions one to six of the interview were designed to establish the type and extent of information sharing in which each respondent regularly engages or oversees.

When asked about the last time they had been involved in the information sharing process, all five maintained that it was an ongoing process, and took place daily. All transactions were reported to take place via phone calls and/ or a physical paper exchange, with some transactions being a series of both phone calls and follow-up paper exchange. Two reported they looked to a database first in order to see if the item which needed to be shared was a routine non-personal item and available by database access. Whether the item of information to be shared was

available by database access or not, these two respondents also made use of a phone call and paper exchange to share the needed information.

Concerning the organisations involved in sharing, not surprisingly, most often the organisation involved in information sharing was children's social care. Because information sharing is a daily occurrence and an ongoing event, the interviewer desired a snapshot of an information sharing transaction as an example: between which organisations did the last transaction take place and which was the initiating organisation? The interviewees gave the following responses:

rLAL – children's social care requested information from youth offending

rLAD – children's social care requested from mental health

rSC – children's social care requested from adult social care

rNHS/SC – adult social care requested from children's social care

rNHS – children's social care requested from the GP surgery

All the respondents reported sharing both universal and personal information daily.

6.2.2 Part Two: DMAC: Workable solution?

Three questions comprised part two. First, the respondents were asked if DMAC would be technically workable in each of their respective agencies. Without exception, all interviewees responded emphatically and positively, that DMAC is technically workable. One (rNHS) mentioned that he know of one project where a very similar model was now in the implementation process. Two respondents

(rNHS/SC and rSC) reflected positively on the limited-life dataset which they saw as a key selling point for stakeholders. rLAD mentioned one other point, that if DMAC were implemented he would require it be technically secure.

When asked if there were any aspects of DMAC each would change, two respondents had suggestions. rNHS/SC asked why the model would be limited to children's social care; he thought DMAC an excellent model and both children's and adult services would greatly benefit. rSC had a difficulty with the limited-life dataset. If it were agreed by all organisations that the life of the dataset be, for example one week, rSC asked about new relevant events in the life of the child involved which might transpire on day two, or day three. If the dataset were frozen for one week, it would also need to be stringently monitored and provision would need to be made if new events took place, such as a new replacement dataset, an amended dataset, etc.

The last question brought about the most comprehensive responses. When asked if they could picture their organisations adopting DMAC, all five individuals responded by saying no, they could not, but not because of any fault in the model. Each respondent listed multiple challenges within his/her organisation. The respondents collectively listed thirty-seven challenges of various types.

After considering the variety of responses and also recalling the socio-technical elements described in chapter three, the researcher observed that the challenges might most usefully be organised into four areas:

- Collaboration challenges (COL) represent the issues involved when organisations work together. One example of a COL challenge was, "The NHS has its own governance and is not open to working with other organisations" (voiced by rLAL).
- Environmental challenges (ENV) represent the greater environment in which organisations operate, such as the NHS, government policy, or public opinion. More than one individual cited challenges surrounding government issues: "Changes in government are incredibly disruptive to systems already in place. The last change in government cut out ContactPoint, our working system" (rNHS, rLAD, rLAL).
- Hardware, Software, and Electronic Record challenges (H/S/R) are as identified, and could be electronic challenges within the organisation or challenges between organisations which have to do with hardware, software or electronic records. An example of an H/S/R was: "Multiple stand-alone systems with varying degrees of sophistication are difficult to work with" (rNHS).
- Organisational challenges (ORG) embody issues within the organisation itself. "Any new system will require a stable environment and stable conditions in which to operate. Most organisations do not operate in stable environments" (rNHS/SC).

These category assignments are, of necessity, arbitrary and could be arranged in different ways. For example, the challenge "Organisations keep changing their

base information systems and software due to political reasons" was categorised by the researcher as H/S/R but it could have been categorised as ORG because it is the organisations which keep changing their electronic information systems and updating their hardware and software. It could also have been categorised as ENV because the political reasons are expressly mentioned by the respondent. However, the researcher maintains the position that the challenge voiced by the respondent is actually H/S/R because of the context in which he based his comments. In addition, the term *political* in this sense is not referring to the government, but all the surrounding issues of why software is adopted for use, such as the vendor, timing, management, etc. It is recognised that grouping responses into categories is, in part, a subjective exercise. Table VI-1 lists the challenges given by the respondents according to type along with the respondent/ organisation represented.

Item	Type	Challenge	Resp
1	COL	Getting the local authority and the NHS to work together is difficult on many levels	rNHS
2	COL	The GPs in our area have been surprisingly open to what we are trying to do. Unfortunately, not all staff in health and social care are so agreeable to working together.	rNHS
3	COL	There is fear of sharing information. The information Commissioner has listed 72 things which are not to be shared; a fine is involved for sharing information indiscriminately.	rNHS
4	COL	Health tends to be document-centric; social care is not.	rNHS
5	COL	Even though I am working in the area of integration, this term *integration* has no definition and carries no weight. It means different things to different organisations.	rNHS/SC
6	COL	The NHS is uncooperative. They are happy to obtain other agencies' information for their own purposes, but are unwilling to share their own information with other organisations.	rLAD
7	COL	To make information sharing work, agreements between all stakeholders are necessary, including the NHS, which does not want to share, and schools, which all too readily share.	rLAD
8	COL	The solution to this whole issue is to come up with an overarching information sharing plan that works, and on which all organisations and government parties agree.	rLAD
9	COL	Protocols are very complicated! I work with the legal requirements in writing protocols for information sharing, and it is difficult enough to write one area for protocol requirements between just two organisations. To work with all the agencies which would be involved in an information sharing agreement, in all the different requirement areas, and over a given time period – this would be extremely complex!	rLAL
10	COL	The NHS has its own governance and is not open to working with other agencies.	rLAL
11	COL	People are also reticent about sharing information because they are afraid they will get it wrong. Especially now that the Information Commissioner will issue fines up to £500,000 for violating the data protection principles.	rLAL

12	ENV	Changing political landscape. The last administration set up one system which is now off the table. We just get something set up and unintended change happens -- a new government, changing responsibilities in social care, new NHS structure.	rNHS
13	ENV	There are a lot of things about databases, information exchange, and sharing information that the general public just does not understand.	rNHS/SC
14	ENV	Right now, lack of leadership is a problem. The system we were just getting used to has been axed by this government. Now, we are all waiting for Eileen Munro's research & final report, which is expected out in April 2011. This report will be a major influence and is expected to affect the future of multi-agency working in this country.	rSC
15	ENV	Any new system would need substantial financial backing, which is a fundamental problem right now. To build a system such as this one, to allow for database integration, identity provision, and fuzzy matching – cost is a major barrier.	rSC
16	ENV	Selling DMAC to stakeholders as a tool would not be too much of a problem. The problem would be selling the idea to the public. Even though DMAC is not a database, after all the uproar about ContactPoint, any information sharing tool would be regarded as suspect by the general public.	rLAD
17	ENV	The most difficult aspect of this whole problem is government instability. We just had ContactPoint up and going, and now the new government has axed it. If the Conservatives come up with a plan, and then there is a government changeover to the Labour Party, then Labour would get rid of the Conservative's plan, and come up with a new plan of their own.	rLAD
18	ENV	The press is a negative factor because they publish with the intent to attract readers' attention. Therefore they stir up controversy and publish contentious issues. Example is ContactPoint. We had it up and running, but the press pushed scare stories about security breaches which would surely happen with ContactPoint. And the public believed it.	rLAL
19	ENV	Another problem is the general public. Stakeholders would understand DMAC and the issues involved. However, the general public has a reading level of 9 years old. They do not understand issues in detail and they believe whatever slant the press is feeding them.	rLAL

20	ENV	Changes in government are incredibly disruptive to systems in place, for example the last change of government cutting out our working system (ContactPoint).	rLAL
21	H/S/R	Multiple stand-alone systems with varying degrees of sophistication are difficult to work with.	rNHS
22	H/S/R	GPs in this area have various EMIS systems, some of which are old and need to be upgraded.	rNHS
23	H/S/R	Business systems in local authorities the NHS are of different ages and different levels of sophistication; just this issue alone makes working together a challenge	rNHS
24	H/S/R	In integrating systems, which organisation will hold the "master document," the one to which the others will be based on?	rNHS
25	H/S/R	Without a unique identifier there is no common identity number between health and social care. Health uses NHS number, but social care does not have one comparable common identifying client number.	rNHS
26	H/S/R	Many social care agencies are still paper-based only; they do not have an electronic business system in place.	rNHS/SC
27	H/S/R	A unique identifier needs to be adopted, so at some point in the integration process, it has to be decided which organisation's records are to be the prime records, from which the other organisations will work.	rNHS/SC
28	H/S/R	Organisations keep changing their base information systems and software mainly due to political reasons.	rNHS/SC
29	H/S/R	Data integrity -- the data is only as good as each organisation confirms it to be.	rSC
30	ORG	Integrating the peripatetic staff. At this point it is uncertain whether some staff may be under health or social care.	rNHS
31	ORG	The holding of information becomes the holding of power. This pull from inside the organisation needs to be dealt with.	rNHS/SC
32	ORG	Any new system will require a stable environment and stable conditions in which to operate. Most organisations do not operate in stable environments.	rNHS/SC
33	ORG	Any new system must have the solid backing of senior management.	rSC
34	ORG	Any new system must be embedded in the business process of the organisation.	rSC

35	ORG	Any new system must be actually based on normal, daily working procedures. This would require training, along with monitoring and support from management to ensure this would happen. Always a human needs to be monitoring such processes; they wouldn't run by themselves.	rSC
36	ORG	Most importantly, the first step in implementation of this new working plan should not be technology! Establish the business processes first.	rLAD
37	ORG	There is such unevenness in the types of information systems and the quality of data held. For example, Protocol, the new children's database just implemented, are reporting that it cannot handle some necessary types of information and social workers are continuing to use the paper system right alongside of the electronic system. Also, youth offending still uses a paper system and does not have a working database.	rLAL

Table VI-1. Challenges to information sharing identified by interviewees.

6.3 DISCUSSION

In the first part of the interview (engagement in the actual information sharing process) it was established that all respondents were IT professionals, and represented relevant agencies as well as relevant specialties in children's social care and multi-agency working.

In the second part of the interview, all five individuals were emphatically positive when asked their opinions about DMAC. All said that the timeline underpinning information sharing was especially relevant and valuable. Two mentioned the limited-life dataset in particular as a good selling-point to stakeholders. One individual expressed a strongly positive assessment of DMAC and wondered why it was limited to children's social care.

Table VI-2 illustrates the breakdown of responses according to type. A number of things are interesting to note about the responses:

- There is a general distribution of over all types of information sharing challenges mentioned by the respondents; however, three respondents listed no challenges in certain areas.
- The collaborative working (COL) type of challenge was highest in representation with a total of 11 challenges identified overall; however, the respondent from children's social care did not list one collaborative working challenge.
- The respondent from the NHS listed the most overall challenges (11) which also represented the most in any category by one respondent.

rNHS lists a high number in H/S/R challenges because he is working directly with the NHS' new electronic record, the Summary Care Record (SCR).

Respondent	COL	ENV	H/S/R	ORG	TOTAL
rSC	0	2	1	3	**6**
rLAD	3	2	0	1	**6**
rLAL	3	3	0	1	**7**
rNHS	4	1	5	1	**11**
rNHS/SC	1	1	3	2	**7**
TOTAL	**11**	**9**	**9**	**8**	**37**

Table VI-2. Breakdown of interviewee responses according to type.

Overall, it is evident that the challenges to multi-agency working are not with the DMAC itself, but with the socio-technical issues surrounding information sharing, the collaboration, environmental, organisational, and the issues surrounding hardware, software, and electronic records.

Many of these challenges were discussed in chapter three. The first two Critical Success Factors (CSFs) of Decision Motivation identified by Lu et al. (2006) are strong internal and external commitment (CSF1) and shared motivation and vision (CSF2). The challenges identified by the interviewees illustrate these CSFs:

- "Any new system must have the solid backing of senior management" (rSC).
- "Right now, lack of leadership is a problem" (rSC).
- "The NHS has its own governance and is not open to working with other agencies" (rLAL).

The critical success factors of the implementation process identified by Lu et al. (2006) such as high integration with internal information systems (CSF4) and inter-organisational business process reengineering (CSF5) are likewise illustrated by the respondents:

- "Organisations keep changing their base information systems and software mainly due to political reasons" (rNHS/SC).
- "Multiple stand-alone systems with varying degrees of sophistication are difficult to work with" (rNHS).
- "Most importantly, the first step in implementation of this new working plan should not be technology! Establish the business processes first" (rLAD).

Finally, CSF6, advanced legacy information system and infrastructure, and CSF7, shared industry standards, are represented by interviewees to a lesser degree. Advanced legacy systems and shared industry standards are being addressed, such as by rNHS, who said, "Without a unique identifier there is no common identity number between health and social care. Health uses NHS number, but social care does not have one comparable common identifying client number." These are in the minority, however. As illustrated by the interviewees' challenges, organisations are working on more fundamental issues, and have not yet reached an advanced stage of working, although both rNHS and rNHS/SC are hoping to make progress in this area.

6.4 LIMITATIONS OF THE INTERVIEW STUDY

The primary limitation in a study such as this one is that the specialists represent a limited number of roles and organisation types. Some organisation types such as the voluntary sector or education are not represented. Neither are roles, such as those of an IT specialist who works in connection with the NHS Caldicott Guardian or a think tank represented. A larger study would be able to gather views from additional specialists, organisations, and role types.

There is also a danger of implication in an interview study such as this one. For example, only one IT specialist from the NHS is represented (rNHS). It is likely this individual does not represent the views of all NHS staff. A larger study would need to involve multiple individuals from an organisation.

This study clearly set out to interview those in IT-related roles, because the interviewer desired to gather opinion from IT specialists as to whether the DMAC model is a workable model and a viable alternative for electronic information sharing among organisations. The DMAC model is one part of a socio-technical system, however. If non-IT specialists, such as frontline social workers or health workers were interviewed, it may be found that their views regarding the feasibility of working with the DMAC model are different to their IT colleagues. Non-IT health care or social care staff would, perhaps, raise their own distinctive objections to the day-to-day working with the DMAC model.

Another limitation was the limited amount of time allotted for each interview. If more time were available, respondents may have been able to identify many more socio-technical challenges and the data in Table V-2 may have been fuller and more illustrative of actual challenges faced by IT professionals.

Nevertheless, there is a variety of responses included in this interview study from a variety of roles and organisations. These specialists have confirmed the viability of DMAC which is underpinned by a timeline and the limited-life dataset – accomplishing one objective of this thesis. The specialists interviewed unequivocally state that the architecture and functionality of DMAC are sound, and confirm its claims to encourage information sharing through the use of a limited-life dataset underpinned by a timeline.

6.5 CONCLUSION

DMAC was designed to facilitate information sharing, particularly because it is underpinned by a timeline with a limited-life dataset. This dataset would overcome some of the resistance to information sharing because its dataset has a limited life and would dissolve at the agreed time of expiration. Further, DMAC upholds data protection principles and no record in created in the process of gathering information. In order to provide some type of external validation for the DMAC model, this interview study was undertaken to ascertain specialists' views on the DMAC process and its claims.

DMAC was found by all specialists to be a sound model of information sharing among organisations. When asked about adoption into their own organisations, a number of challenges were identified. However, because of the limited-life dataset, all those interviewed felt DMAC would help to overcome resistance to information sharing.

Chapter Seven: Conclusion

7.1 INTRODUCTION

This thesis is an investigation into the process of sharing personal information among organisations, with its subject material being information sharing among organisations which provide services to children. A theoretical model, Dynamic Multi-Agency Collaboration (DMAC), has been introduced as an effective measure to assist in the information sharing process.

Assisting children and families who need help by organisational collaboration is a challenge which is comprised of a great many factors. DMAC addresses one key problematic area of the information sharing process. It is not a cure-all, but rather a focused solution to overcoming some of the barriers to information sharing in a particular area, i.e., immediate information gathering which is underpinned by a timeline. It is the timeline with its limited lifespan which enables data providers to more freely share information within the boundaries of data protection. Providing the practitioner immediately with substantially more information, s/he can make a knowledgeable plan of help.

DMAC assists in providing information to practitioners who need it. The gathering together of information to assemble the complete picture of a child and family in need from the child's records in separate organisations results in better information. Better information can result in a more knowledgeable plan, which in turn may result in a more appropriate intervention.

In the bigger picture, DMAC is a model which has potential to be of great value in an important policy context and for public sector reform. Public sector reforms put an increasing significance on multi-agency collaboration and DMAC addresses a key part of this collaboration.

7.2 DISCUSSION

It is clear that there remain problematic areas throughout the information sharing process among children's service organisations. This thesis was designed to answer the following research questions:

1. What factors are critical for the successful computer-based information sharing of children's personal information?
2. What are the barriers which arise from the special issues in sharing children's personal information?
3. Is there an information sharing model which incorporates the critical factors for information sharing success, and also acknowledges and successfully manages the obstacles to information sharing?

Chapter three identified "Best Practices" in information sharing and considered the importance of a socio-technical (ST) approach in Information System (IS) design. Seven Critical Success Factors (CSFs) necessary for Inter-Organisational Information System (IOS) success were outlined and the national database, ContactPoint, was then evaluated according to ST principles.

Barriers to information sharing were discussed in chapter four. The special issues of data protection and timeliness were explored and the necessity of an information sharing framework was also identified.

Chapter five presented the proposed ST model, Dynamic Multi-Agency Collaboration (DMAC). One of the main factors which supports data sharing is the timeline underpinning the DMAC dataset. After a certain period of time, the DMAC dataset dissolves; neither a database nor any permanent record is created in the process. The fact that the DMAC dataset has a preset limited lifespan gives more control to data providers who would be more inclined to readily share information through the DMAC model. Chapter five included an evaluation of DMAC according to ST guidelines.

The previous chapter, chapter six, appraises the DMAC model by external validation via an interview study of local IT specialists involved in information sharing. Their views support the DMAC model and also confirm that resistance to sharing among organisations would lessen because of the limited life of the DMAC dataset.

7.3 LIMITATIONS OF THIS THESIS

There are inevitably a number of limitations in any study such as this one. For example, there is the challenge of applying socio-technical (ST) principles to complex health and social care systems. Because sharing personal information among organisations is a complex issue with many components, individual

areas will continually need to be re-examined (Peckover et al., 2009), communicating effectively is a major issue (Munro, 2005), and managing change is a continual process (Mumford, 2003).

There is a risk of oversimplification in a thesis which provides an introduction to the subject of ST design in IOS for effective information sharing among children's service organisations. The breadth and depth of the social and technical aspects of information sharing could fill many volumes. What this author has chosen to include in this introductory study will differ from what another author may include.

In addition, the changing information culture cannot be ignored. As in any current events topic, the subject of this study is changing constantly. Even the national database, ContactPoint, has become obsolescent. Isolated adverse events, such as poor professional judgement in a child's case or a large government security breach, can spark professional and public interest, possibly changing the direction of legislation. Furthermore, a change in the governing party after a general election can sweep away much of the work done on a current national project. Managing change, whether in legislation, the workplace or in public opinion, will always be a factor, possibly rendering past research less directly relevant.

7.4 FURTHER RESEARCH

This research, based on a preliminary application of ST principles to information sharing among children's service organisations, cannot be used as a comprehensive introduction to the subject of electronic information sharing. Rather, its intent is to serve as a beginning for future research and debate. Because of the multiple components of both the socio and the technical aspects of information sharing much additional research is needed investigating these and related areas.

Research into organisation communication and agreement are especially required in order to develop robust frameworks for information sharing. As previously stated, for an effective information sharing system there must be agreement on the shared motivation and vision of all organisations involved in the collaboration. This is difficult when organisations may not be accustomed to hold to a transparent communication process. It would be hoped that further challenges to information sharing will be considered socio-technically.

7.5 CONCLUSION

As illustrated throughout this thesis, sharing personal information about children is a complex process beset with difficulties, particularly with new technologies and data protection to complicate the issues. The sharing of such personal information held electronically by various organisations involves issues arising from law, professional boundaries, ways of working within and among

organisations, and many other related issues, particularly when children are involved.

Many areas of inter-organisational disagreement persist. For example, regarding data protection and giving personal consent for information sharing, the Department of Health favours an "opting out" approach, where patients must specifically state their preference for avoiding automatic inclusion in the sharing of their own information. Many GPs, however, and the British Medical Association, insist on the "opting in" approach, whereby patients should have the right to specifically state if they want their information to be shared. A path through these and other disagreements must be negotiated for better communication and collaboration for information sharing.

Organisations must address the double challenges of information management and sharing. They must create records to comply with government requirements to share information. According to the Information Commissioner, an organisation's record system needs to be managed effectively and consistently. Current practice, however, illustrate systems where personal information is often handled on a time-consuming and inconsistent case-by-case basis. Yet, in healthcare, social care, education, and other children's services, a high-caliber electronic records system for access and sharing information is crucial as the quality of services offered can be greatly increased, and children better helped by a smooth-running system of effective information sharing.

This thesis asserts that the DMAC model supports information sharing among organisations because of its limited-life dataset. It is the timeline which would give more control to data providers who would subsequently be more inclined to share information within the legal terms of the Data Protection Act.

At the beginning of the twenty-first century, we now have empirical evidence outlining what is necessary for effective information sharing among organisations; this body of evidence is growing. The field of ST design is a relatively new one as its solutions provide effectiveness whereas technical or top-down approaches have been shown to offer limited success. The proven usefulness of the ST approach will no doubt continue to be useful in evaluating and building IS in organisations in general and in children's service organisations in particular. DMAC has a great deal to offer this field.

For the present information sharing collaborations, however, there is no magic solution. Ultimately, it is the effectiveness of strong leadership and commitment to collaboration which is the first step required of the organisations themselves. A model such as DMAC can only be adopted and implemented where there is the infrastructure and support already in place, and where ST principles are recognised and upheld as the accepted way of working.

The critical challenge facing organisations is to create well-designed and successful information sharing systems within and among children's service organisations, seamlessly delivering required information in order to assist practitioners in taking needed action in helping and protecting children.

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Appendices

APPENDIX A – Health Information System Applications

Ninety-nine applications of a national-scale health information system comprising Infrastructure, Administrative and Financial, and Clinical Applications (Brown et al., 2003).

Infrastructure Applications

1) Duplicate Record Merge: Patient Merge
2) Health Level Seven (HL7)
3) Kernel
4) Kernel Toolkit
5) List Manager
6) MailMan
7) Master Patient Index (MPI)
8) Master Patient Index/Patient Demographics (MPI/PD)
9) Minimal Patient Dataset (MPD)
10) National On-Line Information Sharing (NOIS)
11) National Patch Module
12) Network Health Exchange (NHE)
13) Patient Data Exchange (PDA)
14) Remote Procedure Call (RPC) Broker
15) Survey Generator
16) VA FileMan

Administrative and Financial Applications

1) Accounts Receivable (AR)
2) Automated Information Collection System (AICS)
3) Automated Medical Information Exchange (AMIE)
4) Automated Safety Incident Surveillance Tracking System (ASISTS)
5) Clinical Monitoring System
6) Current Procedural Terminology (CPT)
7) Decision Support System (DSS) Extracts
8) Diagnostic Related Group (DRG) Grouper
9) Engineering
10) Equal Employment Opportunity (EEO)
11) Equipment/ Turn-In Request
12) Event Capture
13) Fee Basis
14) Generic Code Sheet
15) Hospital Inquiry (HINQ)
16) Incident Reporting
17) Income Verification Match (IVM)
18) Integrated Funds Distribution, Control Point Activity, Accounting And Procurement (IFCAP)
19) Integrated Patient Funds
20) Integrated Billing (IB)
21) Library

22) Missing Patient Registry
23) Occurrence Screen
24) Patient Representative
25) Personnel And Accounting Integrated Data (PAID)
26) Police And Security
27) Record Tracking
28) Voluntary Timekeeping

Clinical Applications

1) Admission, Discharge, Transfer (ADT)/ Registration
2) Computerized Patient Record System (CPRS)
    a) Adverse Reaction Tracking
    b) Authorization/Subscription Utility (ASU)
    c) Clinical Reminders
    d) Consults/Request Tracking
    e) Health Summary
    f) Hepatitis C Extract
    g) Problem List
    h) Text Integration Utilities (TIU)
3) Dentistry
4) Dietetics
5) Home-Based Primary Care (HBPC)
6) Immunology Case Registry (ICR) Overview
7) Intake and Output
8) Laboratory
    a) Anatomic Pathology
    b) Blood Bank
    c) Electronic Data Interchange (LEDI)
9) Lexicon Utility
10) Medicine
11) Mental Health
12) Nursing
13) Oncology
14) Patient Care Encounter (PCE)
15) Pharmacy
    a) Automatic Replenishment/ Ward Stock (AR/WS)
    b) Bar Code Medication Administration (BCMA)
    c) Consolidated Mail Outpatient Pharmacy (CMOP)
    d) Controlled Substances
    e) Drug Accountability/Inventory Interface
    f) Inpatient Medications
    g) Inpatient Medications, Intravenous (IV)
    h) Inpatient Medications, Unit Dose (UD)
    i) National Drug File
    j) Outpatient Pharmacy
    k) Pharmacy Benefits Management (PBM)

l) Pharmacy Data Management (PDM)
m) Pharmacy Prescription Practices (PPP)
16) Primary Care Management Module (PCMM)
17) Prosthetics
18) Quality: Audiology, Speech Analysis, And Reporting (QUASAR)
19) Radiology/ Nuclear Medicine
20) Remote Order Entry System (ROES)
21) Resident Assessment Instrument/ Minimum Data Set (RAI/MDS)
22) Scheduling.
23) Social Work
24) Spinal Cord Dysfunction
25) Surgery
26) Risk Assessment
27) Veteran Identification Card (VIC)
28) VistA Imaging System
29) Visual Impairment Service Team (VIST)
30) Vitals/ Measurements
31) Women's Health

APPENDIX B – Information sheet for interviewees

Electronic multi-agency collaboration: A model for sharing children's personal information among organisations.

Thank you for your willingness to give your opinions and share your expertise regarding multi-agency working. Your interview contributes to the final part of a five-year research project culminating in a doctoral thesis with the above title. Your opinions will assist in providing the researcher with valuable feedback regarding new ways of information sharing and assisting children in receiving help from children's services. By participating in the interview, the researcher understands this to mean that you have consented to any of the information supplied being included in aggregated data to be used in possible future publications, and to being quoted anonymously in possible future publications.

Dynamic Multi-Agency Collaboration (DMAC) is a proposed model for multi-agency information sharing which will help children's services to collaborate with other organisations such as hospitals, GP surgeries, and schools. Because a child or family may have used services of multiple organisations, putting together a complete picture of a child/ family in order to help often involves assembling this personal account from different sources.

The DMAC limited-life dataset

When a child and family come to children's services for help, a social worker typically may need more information about the child and family during an assessment process. In order to provide help to the child and family, the social worker may want to know if the child has visited the GP and has any illnesses or injuries. The social worker may likewise want to know if the child has been hospitalised recently, and if there are any injuries which might be consistent with abuse or neglect. It may be that the social worker wants to know if the child has been absent from school. Because the social worker needs information from other organisations in order to help the child and family, s/he sets out to obtain the needed information.

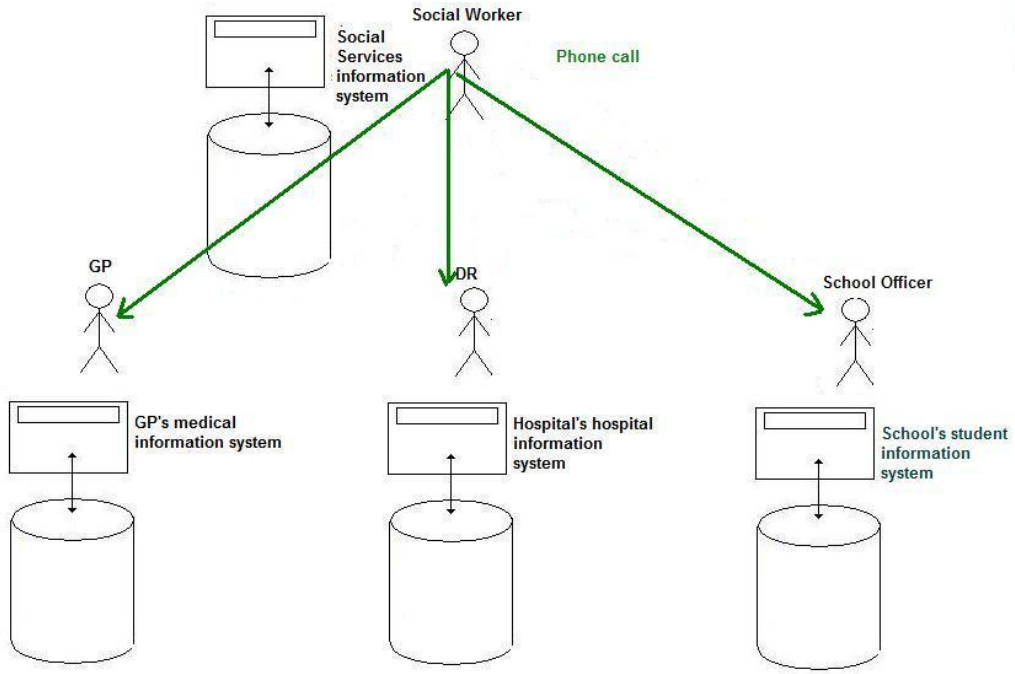

Figure 1. Multi-step process whereby a Social Worker telephones organisations in order to arrange a meeting to gather necessary information on a child.

Many times, the social worker telephones other organisations, and may have contact names in these organisations s/he tries to reach. It may be such a situation that the social worker decides a strategy meeting is in order, and so sets in motion a tentative meeting to be scheduled at a certain time; s/he is hopeful she can reach the contacts in the other organisations and that they will have time in their diaries for a meeting at a common time. This is a multi-step process whereby a social worker rings the GP, the hospital doctor and the school officer. S/he speaks to each person in turn for information (assuming the person is in the office and available to speak on the telephone) and to arrange a strategy meeting for the child and family, if necessary. Putting together a complete care plan is often not possible until the social worker is satisfied s/he has all the needed information from various organisations. Figure 1 shows this multi-step process.

In the new way of working with DMAC, however, the social worker does not need to ring around to various organisations in order to request information or attempt to schedule a meeting. When a social worker needs information from other organisations to help the child and family, using DMAC s/he will be able to extract immediately the necessary information from relevant portions of the child's record residing in the GP surgery, hospital, or school. Figure 2 illustrates the social worker obtaining all the needed information immediately through the DMAC system.

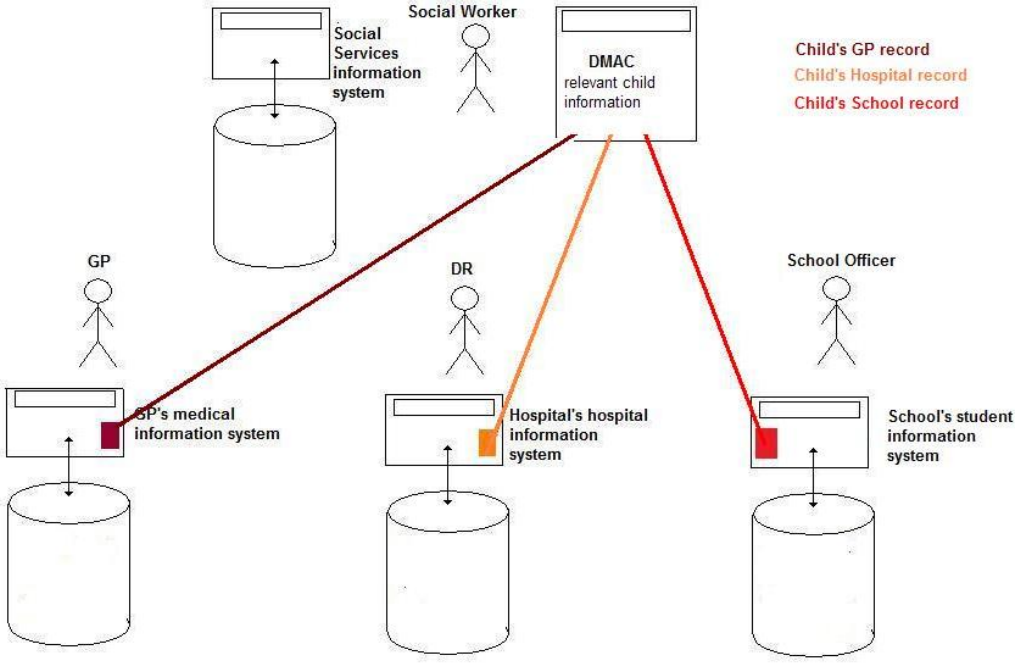

Figure 2. DMAC providing immediate access to all needed information.

Using DMAC, a social worker extracts the needed information directly on his/her computer. This is possible because the GP surgery, the hospital, and the school have previously agreed to provide certain information from records should an authorised person need the information, and also because the social worker is authorised for access. A framework for information sharing has been agreed upon by all organisations whereby each agrees which part of the record is to be shared, with whom, and under what circumstances.

The information s/he receives from the organisations is in the form of a dataset which has a limited lifespan. This timeline, the limited life of the dataset, has also been previously agreed upon by all organisations, and may be, for example, one week or ten days, or another amount of time. Since this dataset will disappear at a prescribed time, there is no permanent record and the organisations' integrity of records remains intact. Existing protocol according to DMAC

frameworks define precisely how long the temporary dataset will exist. When the shelf-life of the dataset has expired, the dataset self-destructs.

Using DMAC, an authorised social worker is now able to request needed information by computer. Information is gathered from different organisations and presented to the social worker who reviews the dataset and is able to take immediate action without the child/ family waiting days or weeks for services. The temporary record lasts only to serve its purpose, then it self destructs. The creation of such a record is solely possible because each organisation has decided in advance which parts of the patient/ client record will be shared and under which circumstances. A secure audit trail remains and strict confidentiality is upheld by this process and there is full compliance with Data Protection Act 1998 as well as each organisation's policies.

There are multiple options as to the method with which the technical framework could be realised. One possibility is a web application which could be used for file sharing. Figure 3 shows a simplified example of a hospital XML record which could be used by organisations in order to allow the social worker, through DMAC, to extract the needed elements. In the final instance however, it will be the effort between DMAC and the developers which will work out exactly how DMAC will extract the needed information from the organisations' information systems.

```
<child>
<child unique id>1234567</child unique id>
        <name>
                <firstname>Joseph</firstname>
                <middlename>Roberts</middlename>
                <lastname>Jones</lastname>
        </name>

        <address>
                <street number>1059</street number>
                <street name>Princes St </street name>
                <apt number>17</apt number>
        </address>

        <services provided this visit>
                <enter date>21/11/2010</enter date>
                <discharge date>22/11/2020</discharge date>
                <provider>Dr. Smith</provider>

                <service type>
                        <blood test>XYZ</blood test>
                        <blood pressure check>120 / 80</blood pressure check>
                        <physical examination> …</physical examination>
                </service type>
        </service provided this visit>
</child>
```

Figure 3. A simplified example of a hospital XML record.

Although this proposed solution, DMAC, is not cure-all for all the difficulties in information sharing between organisations, it may well be the first step in improving service delivery, better and more quickly helping children and families.

APPENDIX C – Questions for interviewees

Engagement in the information sharing process

1. Which part do you play in the information sharing process within your organisation?

2. When was the last time you were involved in information sharing?

3. How did the information sharing transaction take place?

4. Between which organisations did sharing take place?

5. When you have shared information (or managed sharing), did another agency seek information from your organisation, or did you seek information from another agency?

6. What kind of information did you share and how much? e.g., universal information such as a name and address, list of previous family difficulties, or a history of problems with family, housing, and social or mental problems?

DMAC: Workable solution?

7. Focusing on the technology, do you think DMAC is technically workable and would encourage information sharing in your agency or organisation? If no, which parts might not be workable?

8. Are there any aspects of DMAC you would change in order to work better in your organisation?

9. Can you picture your organisation adopting a collaborative model such as this one for a future solution? What might be the challenges in implementing DMAC in your organisation?