

Article

Providing an Architecture Framework for Cyberjustice

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Abstract: The paper illustrates how architecture can be used to show the contribution and the use of technology in the legal system. The models created enable the rapid identification of the stakeholders, their objectives, the technologies they use, and their goals. Such understanding helps decision makers ensure that the tools and processes enabled by information technology (IT) are aligned with the goals of the legal system. The preliminary framework developed in the paper shows the feasibility and the contribution of such models on a larger scale.

Keywords: information technology; architecture; cyberjustice; access to justice

1. Introduction

The objective of this paper is to illustrate how architecture modelling can be used to better understand the contribution and the use of technology in the context of cyberjustice. To reach this objective, two jurisdictions were studied: British Columbia and Ontario. The architecture created enable the rapid identification of the stakeholders, their objectives, and the technologies they use. Such understanding enables decision makers to compare different situations, possible solutions, and weight conflicting goals.

Cyberjustice is the integration of information technology (IT) to dispute resolution processes [1]. There are many initiatives in place that can be included under this term. As will be discussed in the

paper, IT has been used to enable many facets of cyberjustice. For example, videoconferencing (replacing appearances in person) or electronic filing are in place in many jurisdictions.

The impact of cyberjustice initiatives is not simple to assess. For instance, the introduction of information communication technologies (ICT) to substitute travel by electronic exchange can improve access to justice because it reduces the effect of geographical barriers. At the same time, such use of ICT can reduce access for vulnerable segments of the population, who stand on the wrong side of the digital divide.

Assessing the impact of cyberjustice initiatives and ensuring that IT is used in the most beneficial way will require an integrated view of the various initiatives. This will enable the assessment of direct impact, spillover effects, and unanticipated consequences. Currently, such an integrated view is not available.

Such assessment, to be comprehensive, should address four main elements: the architecture (laying out the IT, actors, goals, and usages), the social element (how individuals use and react to the IT), the organizational element (how the legal system adjusts to the technology), and the legislative element (how lawmakers respond to these changes). This paper tackles the first component; the architecture.

Understanding architecture can be seen as mapping the ground to subsequently investigate individual and organizational aspects of cyberjustice. It is a first step to enable a better understanding of the phenomenon.

Architecture helps understand how the tools and processes enabled by IT are aligned with the goals of the legal system. It offers a map of the relationship between the goals, the various components of the legal system, and their linkages with the tools implemented. This also enables the evaluation of the actual contribution of IT to the performance of the legal system, both in terms of goal achievement (doing the right thing) and efficiency (with minimal resources). Elements from the legal system that have to be modeled in this architecture include objects and documents, processes, locations, actors, events, and goals. Once these elements are identified, and situated in the overall architecture, it becomes much easier to define the corresponding informational content (documents, data) or transformation (use of information, production of new documents, decision) associated with them.

To assess the appropriateness of architecture to represent the components of the legal system, we built a preliminary framework. This framework is used to represent the key components of the Canadian civil justice system, and how different systems and technologies are used to support civil cases, and in particular the goal of access to justice in a broad sense. As will be shown in the analysis, access to justice is supported in a variety of ways. For example, access via videoconferencing is used to lower geographical constraints. Case management systems are also used to improve the efficiency of the legal system, lowering delays in access. The framework can be used to organize a collection of models, each one focusing on a particular element from a specific point of view. The framework positions the various objectives associated with the use of technology.

This framework gives a common map to position each component. It becomes possible to delineate access to justice into its numerous variants: access in remote regions, access for disabled parties, access at reasonable cost, access within reasonable time, *etc.* Once these variants are clearly identified, the role of each actor, their interactions and timing, the documents they produce, and the location of these interactions, can be mapped to each specific variant. This enables the identification of all the information flows associated with the various forms of “access to justice”.

Using an architecture, the numerous technologies implemented or available can be formally evaluated. It enables the assessment of the contribution of each IT solution toward reaching specific goals.

The preliminary framework shows that it is possible to develop such architecture and offers interesting insights on the variety of the roles taken by IT systems. Having such architecture can facilitate the evaluation of new technological solutions, enable the integration of different technologies, and maximize the potential benefits associated with IT use in the legal environment.

The map provided by an architecture can subsequently facilitate efforts of theorization of the effects of IT on the judiciary, as called for by Eltis [2]. It will provide a better understanding of the intended and non-intended consequences of IT deployment and the linkages between each one. It shows for example what types of accesses to justice were prioritized, consciously or not, when undertaking IT deployment. It reveals the variety of technologies available to answer a specific need. More than one tool can be used to address a concern. It also helps understand the breadth of usage of a given IT solution. Finally, it provides a map of established tools to enable decision-makers to take advantage of the modularity of IT when deciding on future investments. This enables decision-makers to take full advantage of future investments. Subsequent research efforts will be able to look at actual use, impact, and appropriation of these technologies and compare them with the intended use. On a more practical perspective, it can help review and analyze the effects specific components of an IT solution may have on the judiciary.

Context

When discussing the goals of the Canadian Civil Justice system, which is used as the illustration in Section 3 of this paper, we emphasized the access to justice. Of course, other goals could be included in the architecture, but access to justice appeared to be a good candidate for the purpose of this paper. Several policy makers and members of the legal community are concerned with the current state of access to justice, pointing out that access to justice is an essential component of a just and civilized society, a right that should be guaranteed to citizens [3]. The concept of access to justice takes several forms, depending on the barriers that are considered. The complexity of legal procedures may make it difficult for ordinary citizens to defend themselves adequately. At the same time, they might not have the resources to afford a lawyer (who would be able to navigate within the complexity of the system), which is another kind of barrier [4]. In some countries, such as Canada, the geography creates additional barriers. Some people might simply be too far from courts to make it worthwhile to take legal actions. The travel costs, added to the legal fees, might be higher than the value of the lawsuit. In other instances, language and the availability of interpretive services may also be barriers for some parties.

Information technology (IT) has shown a significant contribution to the effectiveness and efficiency of private organizations [5]. Considering the challenges faced by the justice systems when considering access to justice [6] and the numerous ways in which different countries have tried to address these challenges [7], it is reasonable to think that IT could also alleviate some of the problems faced by the legal system.

Cyberjustice, by supporting some of the traditional activities using IT, is expected to facilitate access and lower cost of justice. In the legal environment, information technology is often touted as a way to facilitate access to justice. It can simplify access to some procedures, and lower the cost of running the legal system [4]. It can also lower some costs for the citizens (for example, by lowering travel costs using videoconference for people living in remote areas).

However, the specific type of improvement provided by IT has to take into account the context of justice: citizens are entitled to a fair hearing, within a reasonable time, by an independent, impartial tribunal (article 14 of the International Covenant on Civil and Political Rights, cited in [8]).

In addition, these cost reductions may come at a price. Take for example videoconferencing. It is often used for various steps in the legal process. However, it is not without negative consequences, especially on the relationship between the client and his or her lawyer [9]. Unexpected use of technology is also possible. For example, the use of the Internet by jurors may create significant problems in trials [10]. Cases were documented in which jurors started to look up information about expert witnesses, and used Google street view to perform their own investigation, not abiding to the rule stating that the jurors must decide using the evidence presented in court. Some even shared information through social media, going as far as asking people to help decide on the verdict [10,11].

These elements suggest that while IT in the legal environment has provided benefits, it requires great care in its deployment [12]. An architecture, representing the key elements associated with IT deployment, users, and structure, can provide a sound framework to better understand the multifaceted role of IT [13].

2. Justice and Architecture—An Adaptation of the Zachman Framework

Different tools from the information systems field have been used to support the use of IT in the justice system. For instance, ontologies were used to compare legislations and to assess if specific norms complied with legal constraints [14,15]. Process models were used to model dispute resolution systems [16]. Knowledge representation was used to provide search capabilities to allow legal arguments to be extracted from documents [17]. Even formal mathematical modeling was used to provide improved court schedules that would facilitate the efficiency of the process and ensure the uniform application of the law [18]. Models ensure that all the essential elements that have to be included in the IT artifact are included in a formal representation, and that the relationships between these elements are taken into account. Formalization ensures that no element is forgotten or that no criteria are missed [19]. However, these models are usually disparate and tied to numerous separate initiatives. There is no global picture available to understand how to relate the various initiatives. Integration remains a challenge.

In order to simultaneously take into account the goals of the legal system, the variety of information technology used, and the various actors involved, the modeling approach has to be high level. To do so, Zachman's framework [20,21] was adapted to our goal. This model suggests that a complex system can be described adequately using a common vocabulary and a set number of views. The goal is to build a holistic view of the organization. It has become a standard in the information system literature.

The framework is organized according to five points of view (or views, for short), each presenting the perspective of a specific stakeholder, and in six columns, each mapping an aspect of reality (see Table 1). The six columns correspond to different ways of observing, analyzing, and describing the same reality from a specific point of view. Each isolates an aspect of the organizations and systems under study. They answer the "What", "How", "Where", "Who", "When", "Why" of the information system under study.

The *Scope* is the highest and the less detailed view of the framework. It represents the point of view of the planner. The goal of this view is to generally define the size, shape, and the primary objectives of the organization [21]. The *Enterprise Model* shows the owner's view. It maps the main processes, the linkages between the elements, the business constraints as well as the key actors [21]. The third view,

the *System Model* shows the designer's view. Its goal is to transform patterns from high-level models to structured and detailed ones. It determines the data and functions that represent the entities and processes [21]. The *Technology Model* shown at the fourth level is the builder's view. It presents the language constraints, the tools and the technologies required for the systems. The *Components* representation shows the programmer's view. It matches the various parts and systems used in the organization [21]. The last row corresponds to the actual functioning system rather than its models.

Table 1. Sowa and Zachman's framework [21].

	What	How	Where	Who	When	Why
Scope	List of important things	List of processes	List of locations	List of organizations or units	List of events	List of goals
Enterprise model	Semantic model	Business process model	Logistics system	Workflow model	Master Schedule	Business plan
System model	Logical data model	Application architecture	Distributed system architecture	Human interface architecture	Process structure	Knowledge architecture
Technology model	Physical data model	System design	System architecture	Human interaction design	Control structure	Knowledge design
Components	Data definition	Programs	Component architecture	Security architecture	Timing definition	Knowledge definition
Systems	Data	Function	Network	Organization	Schedule	Strategy

Note: elements in cells are examples.

The framework is not prescriptive in any way. It does not specify which tool should be used to model the various elements in each cell [22]. Insofar as the approach is ontological, the objective is to classify a set of relevant concepts to describe a system. Freedom and flexibility provided by this approach often translates in deficiencies that must be filled by other work and research [23]. The main challenge is the difficulty to establish clear linkages between the cells [24] either across aspects (columns) or views (rows).

At the same time, this flexibility is also the advantage of the approach proposed by Zachman [20]. When looking at a level of detail that is not too fine, one can see the key elements (including the goals) and their linkages. In order to understand the contribution of IT in the legal system, one minimally needs three views: Scope, Enterprise model, and Components. Since our goal is to document the current situation, the two other views are not required for our framework since they would represent the models required to build systems.

At the Scope level, relevant actors, their goals, the main units involved, and the geographical aspects will be considered. The Enterprise model level is also important; it presents the conceptual map of these elements, the main processes of the legal system. The Components level shows the specific IT systems implemented. Once these three levels are documented, it is possible to show how they are linked together, and consequently to show how each specific technology is supporting (or not) a specific actor, goal, unit, *etc.*

Mapping all the technologies into the framework, along with an exhaustive list of the elements composing the legal system, is beyond the scope of a paper. The goal is to show the applicability of the

framework to the legal context. Therefore, a subset of each element will be mapped into the framework to test whether it is applicable or not and to assess its usefulness.

The mapping process proceeds one view (level) at a time, one aspect (column) at a time. For each view, the order selected to present the cells reflects dependencies between aspects, that is, aspects presented later use information from cells presented earlier. The order is prescribed by the nature of the system under study. Using this approach on systems other than the judiciary may therefore require a different sequence. Relevant description of the Canadian civil justice system is provided as we move along the cells limiting this description to British-Columbia and Ontario jurisdictions. Relationships and links between cells are established when required.

3. A Structured View of IT Support of the Canadian Civil Justice System

This section presents the key elements used in the architecture. As mentioned earlier, it is a simplified view of a complete architecture built to offer an illustration of what architecture could provide and to assess its usefulness. Therefore, only the main characteristics of the legal system (rather than an exhaustive list) are described and organized through the lens provided by Zachman's architecture [20].

Scope—First View of the Framework

In private law matters, Canada is heir to two traditions of law: British common law and French civil law. In accordance with article 92 (13) of Constitution Act, 1867, civil law rules are the responsibility of the provinces. This section presents a high level overview of the objectives pursued by the civil justice system, the actors and stakeholders, the places where actions in justice take place, the procedure before the courts, and the objectives of the system.

What

The system under study is the Canadian civil justice system. Civil litigation is a means used for establishing and enforcing legal rights in court. The procedure for civil litigation is governed by the rules of civil procedure and by the Civil Code in Quebec and the common law outside of Quebec. A civil trial is only a part of the procedure that includes many other steps.

Why

The main goal of the civil justice system is to be accessible to the citizen to resolve legal disputes justly, efficiently, and at a reasonable cost. The justice system is also a guarantor of equal treatment before the law for all Canadians. This goal includes the various forms of access to justice described in the introduction.

Who

For civil cases, many participants are involved. They can be grouped into two groups: courts and persons. The courts are divided into groups according to the government that created it; federal or provincial. They are also divided according to their role: first instance or appellate courts. At the federal level we have: the Federal Court, the Federal Court of Appeal, and the Supreme Court. At the provincial

level we have: Municipal Court, Provincial Court, Superior Court, and Appeal Court. As mentioned in the introduction, this paper will look specifically at two provinces, namely, Ontario and British Columbia.

At least eight groups of people can be involved in civil cases: parties (plaintiff and defendant), witnesses, lawyers, judges, court administrators and registrars, courtroom clerks, court reporters and (in some cases) interpreters.

Where

The geographical organization of the various courts is based on judicial districts, counties, and cities. The detailed list is provided in the linkages between the courts (who) and the locations in the section presenting the Enterprise model view.

How

A basic civil action typically involves one party (the plaintiff) seeking relief from a court against another party (the defendant). Usually, this will involve the plaintiff requesting that the court order some kind of remedy against the defendant for his or her alleged failure to honour a private obligation owed to the plaintiff. Court procedures can include the following steps. Pre-trial: Initiation of the proceedings, serving and filing the pleadings, document discovery, examination for discovery, pre-trial motions and meetings, pre-trial motions/hearings judgments, scheduling of the trial; Trial: hearing, trial judgment issued. These activities can be followed by appeal and enforcement activities [25].

The linkages between the actors and the steps of the process are presented in the next section.

When

In our case, when representing the first view of the framework, “When” defines relevant moments—the intersection between one or more actors, in a place, for a part of the procedure. As such, there is no specific time to consider formally when looking at the scope. Time and sequence become important when linking actions with specific places in a given sequence. This is described in Section 4.

4. Enterprise Model—Second View of the Framework

4.1. *Who—The Actors and Their Relationships (Time, High-Level Process)*

We here present the actors most commonly involved in a civil suit and the links between them. As previously observed in the Scope, these actors are divided into two broad groups: courts and persons. For increased clarity, these two types of actors will be discussed separately.

4.1.1. Courts

Our purpose here is to understand the organization of the courts (for civil matters) and how the various elements are interrelated. Courts can be grouped by jurisdictions. Provincial courts include inherent and superior jurisdictions, as well as a provincial Court of Appeal (for sake of simplification, several specific courts with limited jurisdictions are omitted from this description) [25]. There are also federal level courts: Tax Court, Federal Court, Federal Court of Appeal, and the Supreme Court of Canada [25].

In Canadian common law jurisdictions (all jurisdictions other than Quebec), the rule of precedent means that a court ruling on a matter is bound by the decisions of higher courts within the same jurisdiction that were made on the same points of law and dealing with similar facts to the case before the lower court. The rule of precedent ought to create a degree of certainty and predictability with respect to legal outcomes (and perhaps also reduce the time it takes to resolve a case), as courts are able to follow a course laid out by superior court rulings. For example, courts of first instance will typically be bound to follow the prior rulings of courts of appeal.

A court of first instance is the first to hear a case. This court will have to determine the applicable law and assess the evidence presented by the parties. Appeal courts review the decision rendered by the court of first instance, but they typically do not conduct a full reconsideration of the case. In some cases, leave to appeal a decision is required. The role of the appeals court is to decide whether to uphold or overturn the order made at first instance.

Routes of appeal are established in each jurisdiction for determining which court has jurisdiction to hear the appeal of a decision at first instance. Provincial and territorial appeals courts are the highest courts in the provinces and territories. Each province and territory has an appeal court or a division that hears appeals to verdicts rendered by superior courts and provincial or territorial courts. The Supreme Court of Canada is the highest court of the land and the final arbiter—its jurisdiction covers all areas. It was created by the Parliament of Canada in 1875 in compliance with Article 101 of the *Constitution Act* of 1867.

4.1.2. Persons

A variety of human actors are involved in the judicial system. We here present the main persons likely to be involved in civil litigation.

The parties: A party is a person who launches a lawsuit or who responds to one. In a civil suit, the plaintiff is the party seeking affirmation of a right (and typically a remedy of some sort) that it wishes to enforce against another party: the defendant.

Witnesses: A witness is a person who testifies in court, and is typically called by one party or the other to support its case. These are key actors, since their testimony can be essential for establishing the facts of the case.

Lawyers: In the case of civil litigation, their responsibility is to give legal advice to the clients they represent, to inform them of the law, to gather the information required for the trial and to make representations at trial (including questioning witnesses and making submissions to the court). Since legal proceedings and their related rules can be quite complex, making it difficult for parties to represent themselves, lawyers can play a key role in facilitating access to justice. They support, assist, and advise litigants who wish to assert their rights and apply the law. They are also officers of the court and duty bound to protect both their clients' interests and the administration of justice.

Judges: The Ministry of the Attorney General of Ontario defines a judge as: "The person authorized to determine legal matters in court" [26]. They are appointed by the federal or provincial governments. Their primary role is to render a verdict in light of the facts and the evidence presented. In the courtroom, judges see to the orderly conduct of the trial and intervene when the evidence presented is inadequate or to obtain clarification on the testimony of the parties.

Clerk of the Court: It is an administrative officer who carries out some of the responsibilities of the court. Its role includes the signature of court orders, the issuance of particular documents, and the maintenance of court's records [26].

Stenographers: Stenographers receive witnesses' depositions during the trial or during interrogations outside of court and certify the accuracy of their notes and transcriptions under their oath of office.

4.2. Where—Linking the Actors and Their Locations

To simplify the text, we use the expression “geographical justice area (GJA)” to denote zones (judiciary districts, counties, cities), the names of which vary from one province to the next. Table 2 summarizes the information on the spatial distribution of courts by jurisdiction. At the federal level, the Supreme Court is in Ottawa. Other federal courts have branches throughout the country.

Table 2. Locations of provincial courts in British Columbia and Ontario.

	Appeal Court	Superior Court	Provincial Court
British Columbia	Vancouver, Victoria, Kamloops, Kelowna [27]	+ 20 locations [28]	Every GJA (a full list is available at [29])
Ontario	Toronto	+ 20 locations	Every GJA [30]

4.3. How—Linking the Process Steps With the Actors

The key steps generally followed in civil litigation are described in [25]. The following section summarizes the main points:

Pre-trial: A plaintiff initiates the process by having a proceeding issued by a court (initiating). Then, the plaintiff serves the process to the defendant who in turn serves its written response and files it with the court (serving and filing). The parties exchange the lists of relevant documents and allow inspections (documentary discovery). Then, each party can examine a representative of the other party under oath or affirmation. These examinations are typically recorded (examination for discovery). Parties may then seek dates from the court to assist in resolving a dispute between them about the litigation. The judge who hears a pre-trial motion may issue a judgement or make a note in the file. Finally, the trial is scheduled should the parties not come to a resolution of the dispute [25].

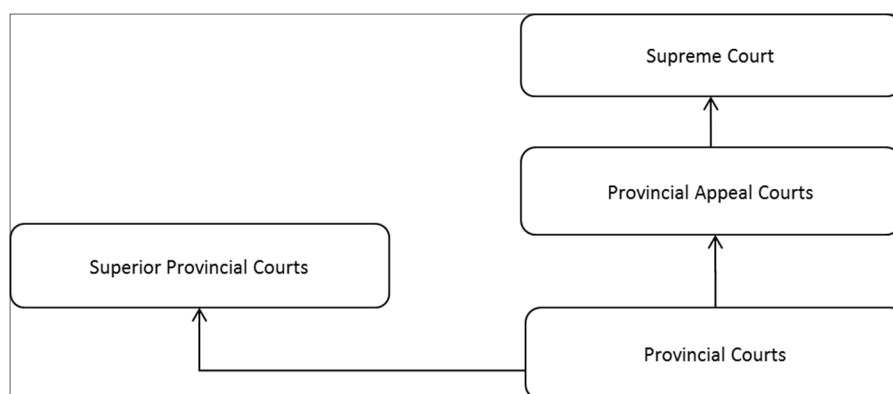
Trial: The trial starts with the hearing where documents are produced, witnesses testify and are examined, etc. Once this is completed, the trial judge issues reasons for judgment [25].

Appeal: If parties want to appeal, they file a notice of appeal. A file is created. Then, preliminary motions (hearings/conferences) are held. It is followed by the filing of appeal record, where the appellant serves on the respondent and files the appeal record and its argument. The respondent also provides its arguments. Hearing follows and an appeal judgment is issued after the hearing [25].

Enforcement: When all appeals are exhausted and delays expired, judgments may be enforced [25].

4.4. When—Linking the Steps with Actors in Sequence

Figure 1 depicts the routes of appeal in cases under provincial/territorial jurisdiction. This figure gives all the possible paths of a civil action when it is brought to trial at the provincial level. Therefore, it should not be seen as directions from point A to point B, but rather as a roadmap, showing all roads available.

Figure 1. Path for a civil action initiated at the provincial level.

5. Systems—Last View of the Framework

Two examples of technologies have been selected to illustrate the use of the system view in Zachman's Framework. One technology supports communication (videoconferencing) while the other supports the management of the case in the administration of the legal procedure (case management system). They are used in a variety of situations.

For these technologies, rather than using the cells at the Component view to describe them, we focus on the relationships that exist between the technology and cells from the Scope and Enterprise model views, as these relationships allow us to analyse how these technologies support the different system's aspects (*i.e.*, the cells).

Videoconferencing: Videoconferencing is the use of IT to support interactive communication between two or more locations, using both audio and video transmission. It is done in real-time through the use of technology [9].

The following Table 3 shows under which jurisdiction (where) which courts (who) are using videoconferencing for which activities in the process (how). It is important to note that the inventory might not be exhaustive. The usages mentioned in the table were documented. This means that there is evidence they exist. However, a blank cell does not constitute a proof that it is not used. It means that we did not find traces of it. Note also that the evidences were collected as of a certain point in time. Therefore, the current state of usage has most likely evolved from the time of the analysis to the time of publication. Still, it illustrates how the approach may be used to assess the support provided by a technology, in a given location, at a given time.

Table 3. Videoconferencing usage.

	Pre-hearing activities	Evidence/Pleading	Witness/ Testifying	Judgment	Appeal
British Columbia	Appeal Court [31,32] Provincial Court (Bail Hearing and solicitor meeting with client) [25]	Appeal Court [31,32]	Appeal Court [32]		Appeal Court [31,32]
Ontario	Provincial Court [33] Superior Court [34]	Superior Court [35]			Appeal Court [36]

Case management systems (CMS): This type of software helps manage a case, from its creation to its closure. It enables document editing and filing functionality to support the preliminary hearings or pleadings. Document sharing and monitoring and the modification of the status of a case helps support the entire procedure. Also, CMS provide functionalities to schedule hearings, to support searching for a specific case or to automate the workflows to support procedure management.

In Table 4, we establish the relationships between CMS and the relevant cells from the Enterprise Model. Again, the inventory might not be exhaustive. The usages mentioned in the table were documented. This means that there is evidence they exist. However, a blank cell does not constitute a proof that it is not used. It means that we did not find traces of it. In addition, some initiatives are underway. For example, Ontario had planned to implement a new court filing system in 2012 [37]. However, recent reports indicate that the project experienced difficulties and was abandoned altogether [38].

Table 4. Case management systems (CMS)’ usage.

	Component level (what)	Enterprise level (how)		Enterprise level (who)	
Enterprise level (where)	CMS or project name	Functionalities supporting the legal process	Functionalities supporting the management of the legal process	Corresponding courts	Targeted use
British Columbia (Victoria)	Civil Electronic Information System (CEIS) [39]	Create, track and change case status	Internal application supporting CSO	Appeal Court Superior Court Provincial Court	Internal
	CSO (Court Services Online) [40]	Fill and file documents	Lookup Provincial and Superior Courts files Access daily case lists filed in a court (Small claims division and Superior Court)	Provincial Court (Small claims division) Superior Court	External
	WebCATS [41]	Track cases	Schedule hearings	Appeal Court	Internal
	Ontario	FRANK [42]	Electronic filing of documents	Monitors regulated time periods for cases; provides an index of cases; generates, notices and court lists; and also provides a calendaring and scheduling tool	All courts province wide
Estates Case Management System [25]			Enables staff to enter and retrieve local estates data	Superior Court	Internal

6. Analyzing IT Support

In this section, a preliminary analysis of the support provided by IT for the civil justice system in British Columbia and Ontario is performed in order to show how an architecture approach can be used to understand IT use in the legal system. The analysis focuses on how IT supports the legal process and its management. Tables similar to Tables 3 and 4 are constructed to map how the different technologies support the judicial system and to highlight specific elements that might be investigated. Tables are manipulated according to their main structure elements.

The columns of the tables identify the technology (The “what” in the Component level) and how it supports the judicial system at the Enterprise Level, specifically the process (“how”), the people (“who”), the purpose (“why”), and the location (“where”). The “when” abstraction was deliberately excluded from the analysis as it shows the intersection between the other abstractions and its presence would only make the table more difficult to read. In order to compare jurisdictions (e.g., provincial/federal court systems), we also include the Scope level “where” information.

It is important to remember that the goal of the IT implementation resides not in the implementation of the IT tool itself, but in the intended support of the goal, unit, person or process. Therefore, the analysis of the tables does not suggest that implementing more technology is better than implementing less technology. What is important is to assess which goals, courts, actors, or procedures are supported, and to what extent, by the various tools implemented. The resulting table (Appendix 1) shows that very different technological tools can provide support to the same components of the justice system. Conversely, a given technology could be used in very different manner from one place to the other to support very different elements.

When comparing the technologies used in Ontario and British Columbia (see Appendix 1), it seems that the latter put more emphasis on case management systems, while Ontario predominantly uses communication tools (Table 5). This suggests that there is no unique trajectory with respect to technology. Information technologies tools are modular and their introduction is also modular. This modularity makes it even more important to develop a representational tool to enable decision to have a global view of the systems in place, and their use and purpose.

Table 5. Support provided by CMS and videoconferencing in British Columbia.

Component level (what)		Enterprise level (how)	Enterprise level (who)	Enterprise level (why)	Enterprise level (where)
Technology	Specific function/ system name				
Video conferencing	Solicitors’ meetings with clients in remote locations	Preparatory meetings	Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom/Elsewhere
		Hearing	Appeal Court	Cost and delay reduction	Courtroom/Elsewhere
Case management systems	Civil Electronic Information System (CEIS)	Management of legal process	Provincial Court	Cost and delay reduction	Courtroom
	WebCATS	Management of legal process	Appeal Court	Cost and delay reduction	Courtroom

Analysis can be performed by filtering the content of the resulting table, focussing on specific rows and columns. Tables 5 and 6 represent the support provided by videoconferencing and CMS for the British Columbia and Ontario courts, respectively. As these tables are obtained from Appendix 1, sources are omitted. This type of analysis shows how a specific technology supports the purpose of the legal system. From these tables, we see that videoconferencing and CMS aim at reducing costs and delays in the legal process.

Table 6. Support provided by CMS and videoconferencing in Ontario.

Component level (what)		Enterprise	Enterprise level	Enterprise	Enterprise level
Technology	Specific function/ system name	level (how)	(who)	level (why)	(where)
Video conferencing	Remote interpretation	Hearing	Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom/Elsewhere
		Hearing	Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom/Elsewhere
Case management systems	FRANK	Management of legal process	Provincial Court	Cost and delay reduction	Courtroom

In a way, one could argue that several different tools can support the same goals (whether it is cost reduction, delay reduction, access, *etc.*). This suggests that new investments have to be assessed on a case by case manner. There is no unique solution for a certain type of problem. Contextualization is essential to ensure that the solution chosen can provide the expected benefits in the most efficient manner.

In addition, comparison of the use of video shows that the same type of technology is used for a different set of activities (How) in each province. This suggests that short term gains could probably be extracted by extending the use of existing technologies (extending the “How” to map usage in other jurisdictions). Extension of the usage of a technology often does not require new implementations, which lowers both the cost and the complexity of the changes required. Formal comparisons of different jurisdictions can outline how existing technology usage can be expanded.

Similarly, some technologies are used in a single instance, while others are used by both the provincial and the appeal courts. Again, extending or replicating the use of a technology to another court might be an easier solution than adding a completely new technology. Even if the technology would run in parallel (if no information is shared between the two courts), the fact that the two instances are running the same tools would create a larger pool of experts, facilitates staff movement between the two instances, and increases flexibility for the judicial system as a whole.

It is interesting to focus the analysis on the different dimensions of the concept of access to justice, as identified earlier: cost and delay reduction, simplification of procedures, access to information. Table 7 presents the content of Appendix 1, reorganizing its content around these three goals and focussing on the legal process step (Enterprise level “how”), the IT being used (Component level “what”) and the jurisdiction (Enterprise level “where”).

As it turns out, the use of technology focusses on increasing access to information and on cost and delay reduction. Our inventory did not find specific instances of information technology implemented primarily to simplify the procedures in the legal system.

As shown in Table 7, British Columbia and Ontario provide a wide array of tools for citizens to access information about the court, judgements, schedules, *etc.* Cost and delay reduction was achieved at all steps of the legal process in British Columbia, and in some of the steps in Ontario. What this highlights is that the effort has mostly been in using technology to accelerate the process as it stands rather than as a catalyst for change. It is a case of automation, the first level of transformation through IT as defined by Venkatraman [43]. This last observation illustrates a difficulty that might be unique to the legal environment when information technology is considered.

Table 7. Support for access to justice.

Enterprise level (why)	Enterprise level (how)	Component level (what)	Scope level (where)
Access to information	Hearings	Other communications	British Columbia
		Websites	British Columbia
			Ontario
Cost and delay reduction	Preparatory meetings	Other communications	Ontario
	Filing	Other communications	British Columbia
		Case administration and management	British Columbia
	Hearing	Other communications	British Columbia
			Ontario
		Courtroom technology	Ontario
	Judgment Management of legal process	Other communications	British Columbia
		Case administration and management	British Columbia
			Ontario
		Other systems	British Columbia
			Ontario
		Other communications	Ontario

Contrarily to what was observed in the context of justice, changes observed in public administrations throughout the world over the last 25 years were not about accelerating or automating existing processes. The changes, often supported by information technology, were transformational in nature. Public organizations were transformed; some activities were abandoned while others were transferred to the private sectors [44]. Public organizations were also asked to overhaul their processes to take advantage of the new possibilities offered by IT. Public organizations have been subjected to new standards of accountability and efficiency. This meant that, in some instances, even their mission was affected. Public organizations went through all five levels of transformations through IT as defined in [43].

Such drastic changes might be very difficult to introduce in the courts and legal environment, apart for some peripheral administrative elements. When any change is considered, the effect on the legal “decision” and “decision process” has to be assessed. The changes introduced cannot be unfair to one of the parties. Often, it is difficult to determine if a change would be unfair to a party. Erring on the side of caution will limit the extent of changes introduced in the legal environment when using information technology.

Understanding the overall architecture of the technologies present can also help assess potential impacts of IT on the legal process and the associated decisions. It is a valuable source of information to assess if changes introduced can be detrimental to any goal deemed important for the management of justice.

7. Conclusions

The analysis highlights points that cannot be made through simple data collection. In order to observe these elements, the data has to be structured formally.

The results show that planning for IT deployment in a given jurisdiction has to be a unique process. It is not necessarily a simple matter of importing technology used in another jurisdiction. Planners have

to first assess what are the key elements that require support. Then, they have to assess if the technologies already in place might support these elements. Technological choices will also be dependent on legacy systems. The addition of a tool and its relative advantage will depend on the infrastructure in place. Technologies used elsewhere can be a good illustration of potential use as long as it is understood why their support is needed. In addition, planners have to remember that there are many different ways to reach the same goal. The objective is not to have a complete array of tools, but to have as many people, processes, goals, or courts supported by IT.

The analysis also facilitated the separation of the idea of access to justice into different components. It is easier, when assessing a given technology, to link it directly to a specific barrier to access to justice (for example, delays, distance, or cost).

The challenges of maintaining a global view of the legal system and its wide IT infrastructure, and the difficulty of coordinating technology investments are immense. This is further complicated because investment decisions can arise from different stakeholders (Executive and Judiciary for example) from different provinces and territories. Over the years, the administration of the courts in Canada became gradually more complex to take into account the evolution of society. Often, IT investments were made along with similar investments done by the provincial/territorial/federal government. This makes it very difficult to maintain an integrated view of IT spending [45] and moreover of the resulting IT architecture.

Results have also shown that the technologies introduced in the legal environment were more targeted toward the automation of the current processes rather than the transformation of the legal processes. In this sense, the use of IT in legal environment differs from the use of IT in other public administrations.

7.1. Contributions

The use of enterprise architecture provides a holistic view of the legal system, its processes, stakeholders, and purpose, and enables the representation of their relationships with the components of the IT systems which support them. The architecture shows which goals, actors, processes or courts are supported by technology, and which ones are unsupported. Linking explicitly the architecture with the priorities of decision-makers should facilitate the strategic planning process.

The use of architecture has shown its value for private sector organizations [13]. The benefits usually observed included notably a better alignment of IT investments with strategy, increased information availability, and an easier optimisation of the IT portfolio [46].

An architecture framework could be used to ensure that the various technologies implemented in the legal environment are aligned with the objectives of cyberjustice initiatives, and that each technology introduced fits into a coherent portfolio of tools.

The preliminary architecture framework developed in this paper showed that such architecture provided additional understanding of IT use in the legal system. It enabled comparisons between two jurisdictions. It also showed where different technologies could be complementary or substitutes to each other. The architecture enabled us to link activities, usages, and goals with the various systems implemented. Results suggest that an architecture, albeit more complete than the preliminary one included in the paper, would facilitate the selection of future investments and highlight where usage of existing technologies could be extended.

7.2. Limitations and Avenues for Future Research

The research has some limitations that should be acknowledged and that would suggest areas for future investigation. First, the paper offered a simplified view of an architecture, using Zachman's model [20]. Additional work can be done in two directions. First, it would be interesting to see if other models of architecture could provide valuable alternatives to Zachman's. While it is the most commonly used one, it is not clear if it is the most appropriate one in this specific case. Evaluating different frameworks to see which one matches best the unique characteristics of the legal environment would be interesting. Once selected, the architecture could be detailed much further. A detailed level of information would provide stronger support for the insights extracted in this paper.

Another element that cannot be ignored is the social aspect of IT use. It is well established that IT is not carrying a set of objective properties. Technology is used (or not) in different ways and individuals will change its use in manners far removed from the intended use [47]. An architecture is not prescriptive nor does it assume that the technology in place has specific properties. It describes the situation and tries to identify the technologies, the actual usages, and the intended and realized goals. It does not suggest a right or wrong way to use IT. The architecture simply offers a map for the various elements decision makers have to consider. It seeks to avoid looking at technologies in isolation. It is very likely that these technologies will be manipulated in different ways. A documented architecture could even show how different systems evolved with time. Further work could use architecture to understand evolution, unanticipated usage, conflicting goals, and various forms of appropriation in a complex environment.

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Author Contributions

All authors contributed to the information collection and the development of the models. The final version of the paper was written by Aubert and Babin.

Appendix: Technology Support for British Columbia and Ontario

The following Table A1 shows which technology (the “what” in the Component level) is used under which jurisdiction (the “where” in the Scope level) which courts (the “who” in the Enterprise level) are using videoconferencing for which activities in the process (the “how” in the Enterprise level). For each technology, we also assessed the purpose of the technology (the “why” in the Enterprise level) and where it is used within the jurisdiction (the “where” in the Enterprise level).

It is important to note that the inventory might not be exhaustive. The usages mentioned in the Table were documented. This means that there is evidence they exist. However, absence of a technology does not constitute a proof that it is not used. It means that we did not find traces of it.

Table A1. Technology support for British Columbia and Ontario.

Component level (what)		Scope level (where)	Enterprise level (how)	Enterprise level (who)	Enterprise level (why)	Enterprise level (where)
Technology category	Technology	Specific function/system name				
Websites		Court Services Online (CSO)/ Search civil files; search daily court lists [48]			Access to information	Elsewhere
		Fillable forms [25]	Filing	Provincial Court (Small claims)	Cost and delay reduction	Elsewhere
		General court information [25]		Appeal Court/ Provincial Court	Access to information	Elsewhere
		Fillable forms [25] Plone [49]	Filing	Provincial Court (Small claims)	Cost and delay reduction	Elsewhere
		General court information [25]		Appeal Court/ Provincial Court	Access to information	Elsewhere
	RSS feed			Appeal Court	Access to information	Elsewhere

Table A1. Cont.

Component level (what)			Scope level (where)	Enterprise level (how)	Enterprise level (who)	Enterprise level (why)	Enterprise level (where)
Technology category	Technology	Specific function/system name					
Other communications	public view		Ontario [50]		Appeal Court/ Provincial Court	Access to information	Courtroom
	terminals						
	internet connectivity		Ontario [51]		Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom
	e-mail	Release of Court of Appeal Reserve Reasons for Judgment [52]	British Columbia Ontario [36]	Judgment	Appeal Court	Cost and delay reduction	Elsewhere
	intranets	Plone [49]	Ontario		Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom/ Elsewhere
	webstreaming		British Columbia	Hearings	Appeal Court/ Provincial Court	Access to information	Courtroom/ Elsewhere
Other communications	webstreaming	Pilot project [53]	Ontario		Appeal Court	Access to information	Elsewhere
	Audio conferencing	Remote interpretation [51]	Ontario	Hearing	Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom/ Elsewhere
			Ontario	Filing [25]	Appeal Court/ Provincial Court	Cost and delay reduction	Elsewhere
	Video conferencing	Solicitors' meetings with clients in remote locations [54]	British Columbia British Columbia	Preparator y meetings Hearing [32,55]	Appeal Court/ Provincial Court Appeal Court	Cost and delay reduction Cost and delay reduction	Courtroom/ Elsewhere Courtroom/ Elsewhere
		Remote interpretation [51]	Ontario	Hearing	Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom/ Elsewhere
			Ontario	Hearing [33,36,51]	Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom/ Elsewhere

Table A1. Cont.

Component level (what)			Scope level (where)	Enterprise level (how)	Enterprise level (who)	Enterprise level (why)	Enterprise level (where)
Technology category	Technology	Specific function/system name					
Case administration and management	Case management systems	Civil Electronic Information System (CEIS) [39]	British Columbia	Mgmt of legal process	Provincial Court	Cost and delay reduction	Courtroom
		WebCATS [56]	British Columbia	Mgmt of legal process	Appeal Court	Cost and delay reduction	Courtroom
		FRANK [50,51,57]	Ontario	Mgmt of legal process	Provincial Court	Cost and delay reduction	Courtroom
	e-filing	CD-ROM	British Columbia	Filing [58]	Appeal Court	Cost and delay reduction	Courtroom
		Court Services Online (CSO)	British Columbia	Filing [39,59]	Provincial Court	Cost and delay reduction	Elsewhere
	e-scheduling	ICON [51]	Ontario	Management of legal process	Provincial Court	Cost and delay reduction	Courtroom
Courtroom technology	Digital audio recording systems		British Columbia	Hearing [25]	Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom
			Ontario	Hearing [60]	Appeal Court/ Provincial Court	Cost and delay reduction	Courtroom
Other systems	Automated systems for jury selection	Courthouse Technology [61]	British Columbia	Management of legal process	Provincial Court	Cost and delay reduction	Courtroom
			Ontario [62]	Management of legal process	Provincial Court	Cost and delay reduction	Courtroom

Conflicts of Interest

The authors declare no conflict of interest.

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