

EXPLORING NEW FORMS OF INTERMEDIATION IN THE FOREST VALUE CHAIN

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Abstract: This paper proposes a method to restructure the forest value chain using intermediaries when a wider range of forest values should be managed for several stakeholders. This method leads to the definition of the strategic vision of the intermediary, including its value proposition and its required competencies, assuming that actors in the value chain are prepared to revise their business approach in order to enable effective collaboration and knowledge sharing. It is applied to support the management of public forests in the province of Quebec, in Eastern Canada. Basically, the intermediary, referred to as the *integrator-supplier (IS)* in the application case, enables several stakeholders, including the government, the forest industry, regional authorities, recreation organizations and First Nations, to communicate, to set compatible goals, and to synchronize their activities. These activities and interactions must all be effectively carried out to maximize overall benefits of forest management. Three critical issues for successful development of the *IS* are identified. Results present functional descriptions of seven development scenarios for effective application of intermediation in forest value chains.

Keywords: Value chain, intermediation, strategic vision, collaboration, coordination.

INTRODUCTION

The global forest products industry (FPI) is currently in a state of crisis, and has been for several years. This crisis has hit the Canadian FPI harder than many countries, as small profit margins on commodity forest products disappear in the face of dropping prices and increasing procurement cost. The province of Quebec, in Eastern Canada, is faced with a particularly challenging situation. With small, slow-growing trees, high unit procurement costs (the highest in the country), rapidly aging industrial infrastructure, and ever-tightening timber supply regulations, the Quebec FPI is in dire need of technical and organisational innovations. A large share of timber procurement activities is conducted by entrepreneurs, contractors and sub-contractors [1]. They fulfill several roles, from planning to suppliers of technical services, and may operate across several functional and organisational layers. Few studies have focused on supplier relationships within the forest sector value chain.

A recent reform of the tenure system on public forest in Quebec, combined with the systemic FPI crisis, presents a unique opportunity. Under the reformed tenure system, responsibility for timber procurement planning shifts from industry planners to the provincial government. By taking on responsibility for timber procurement activities, the provincial government will henceforth be more directly responsible for realization of value creation potential from harvesting of timber on public land. Although the government has nominally taken on responsibility for fiber procurement, they neither have the organizational structure nor the in-house expertise to fulfill this role effectively and efficiently.

One solution to this problem would be for the government to delegate fiber procurement responsibilities to an intermediary agent. This agent would plan and execute fiber procurement activities on behalf of the government in such a way as to respect long-term forest sustainability guidelines, while maximizing value-creation potential for local forest products industry clients by balancing fiber supply and demand across the entire forest value creation network. It would be responsible to establish a network of partners and the contractual agreements needed to manage it, and to implement and operationalize these contractual agreements in a way to enhance effective collaboration and coordination across this network. In fact, the role and services offered by the intermediary agent must be built into the existing forest value chain (FVC) business model. Thus, its value proposition needs to be carefully defined. This paper proposes a structured method for the definition of the strategic vision of the intermediary agent, which we demonstrate in the context of public forest in Quebec, accompanied by conclusions, and proposals for further research on the topic.

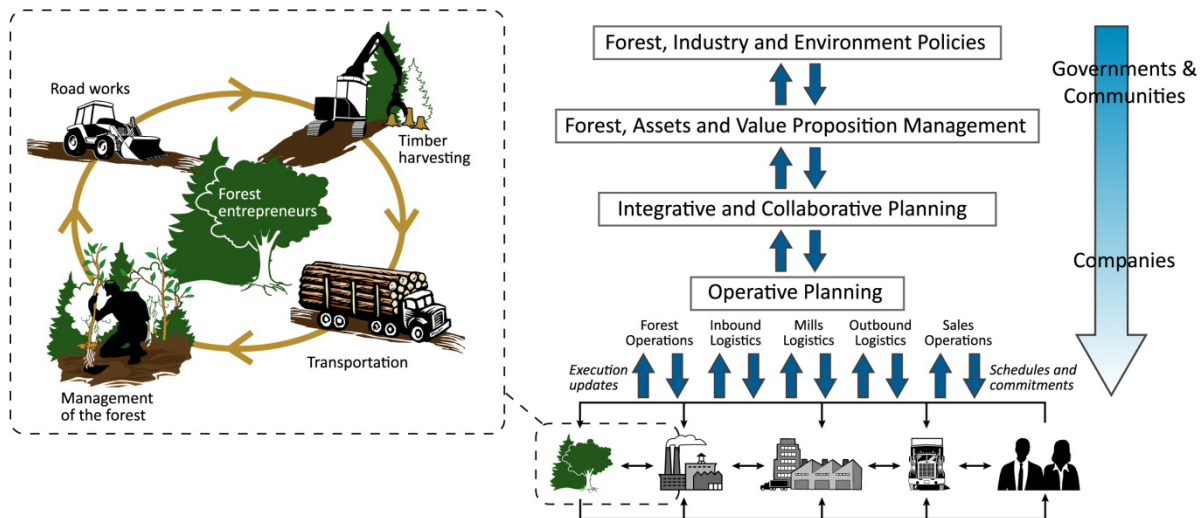


Fig. 1 - Wood supply chain within the forest value chain and the planning decision scales.

BACKGROUND

The Forest Value Chains and its coordination

Forest value chains (FVC) are commonly associated with timber-production networks. These networks include several actors that perform a variety of forest management activities, including planning, harvest operations and silviculture treatments, deployment and maintenance of a road network, transportation of fiber to mills, and forest products manufacturing and distribution. These actors must exchange information at different levels, and generally seek to maximize their profits, with limited collaboration. Many of the upstream actors are logistical services suppliers, such as general entrepreneurs, forest worker cooperatives, forest management groups, silviculture workers or transportation units. These suppliers typically own local or regional businesses within the FVC (Fig. 1), own production machinery, and have agreements with forest products companies (FPC), usually formalized as contracts in which the obligations of the entrepreneur are specified. Other stakeholders like the government, the forest products industry, regional authorities, recreation organizations, and First Nations are involved in the management and planning decisions related to the use of forest resources.

Coordination of the FVC consists in managing the interdependencies among the activities of the different organizations. It is a complex problem, and is typically decomposed using a hierarchical planning approach [2]. Long-term (*strategic*) planning decisions define targeted markets and corporate organization in terms of products, technologies, production capacities and facilities location. Mid-term (*tactical*) planning decisions allocate resource capacity to the various activities in the value chain. Short-term (*operational*) planning decisions define work schedules and assign specific equipment and resources to scheduled activities, including fiber procurement and delivery. The levels of involvement of the FPCs in the different planning decisions depend among other things on the role played by the government as well as on company size. As shown by the shaded downward pointing arrow in Fig. 1, the planning process in the FVC is a continuous process; there is no clear cut demarcation between the plans made at the strategic, tactical or operational levels, and a collaborative involvement of all levels of management from separate organizations is expected. Collaborative relationships (e.g., entrepreneurs–FPCs, Timberland owner/Government–FPCs) are likely to generate tensions or conflicts in such a distributed environment [3]. These conflicts are attributable to the fact that the participants in the decision-making process seek local optimisation of a larger planning problem. The fact that the number of participants in the planning process should increase makes it clear that frustration with the planning process outcome should increase too. As discussed by Thompson et al. [4], this frustration increase is attributable to the lack of early and continuous involvement and conflict resolution skills by certain participants, and to the unclear leadership in a complex distributed-hierarchical decision environment. Hence, the participants and their organizations need to collaborate in finding new ways to coordinate the planning process.

Audy et al. [5] proposed five generic coordination mechanisms for logistics activities intended to help managers design their collaboration schemes. These mechanisms were differentiated by their planning function, sharing approach, and the information, decision and financial flows. They assumed that the planning function could be performed by a third party or with a joint planning process between the collaborating units. However, they did not elaborate on the business context in which this function could be performed nor its position within the chain. In this paper, the third party role is assigned to the intermediary in the context of the FVC, and we propose a method to define the strategic vision of the intermediary. The strategic vision provides the critical link between the intermediary and its environment. It should provide information regarding the following key questions: (i) what does the intermediary do? (ii) For whom does it do it? (iii) How does it capture value? Such questions are commonly asked by strategic innovators or organizations looking to rethink their business models. Krinsky and Jenkins [6] emphasize the need to incorporate three perspectives in the strategic innovation process: an internal perspective (from representatives from key functions in the organizations), an external perspective (from “creative visionaries” or people that have theoretical expertise and real-world experience within a given discipline), and a customer perspective (“insight into emerging customer needs”).

Intermediation

Complex value chains provide intermediation opportunities, whose value proposition may include increased efficiency, economies of scale, reduction of transaction cost, or value added in the chain. Entrepreneurs and businesses are often the first to identify these opportunities and act on them [7]. Interestingly, as pointed out by Curchod [8], literature in strategy and management does not consider intermediation as a specific area of interest. In fact, the term “intermediation” is typically used in the finance, commerce/marketing and intermodal transportation literature. Spulber [9] proposes an “intermediation theory” that stipulates that it is more advantageous for a firm to refer to a reliable intermediary who makes credible promises than to only count on negotiation for recurrent short term contracts. The intermediary coordinates the actions of the trading firms, enabling them to generate economies: it reduces the searching cost (search for suppliers and for prices) by pooling and sharing information between traders, and it generates some sort of scale and scope economy. Spulber sees intermediaries as the agents responsible for procurement and sales activities, or for connecting actors, and does not exclude that the intermediaries could be responsible of logistics activities in the manufacturing sector. Wu [10] developed a theoretical framework to study the formation of intermediaries in supply chains. He considered intermediaries in two broad categories: the *transactional intermediary* and the *informational intermediary*. The former improves the efficiency of certain supply chain transactions, while the latter alleviates inefficiencies due to information asymmetry. According to Wu, these intermediaries can become strategic leaders of a collective effort to improve overall efficiency in a vertically-integrated supply chain. Wu refers to this leader as the “integrator”.

The forest industry is globally facing the same challenges and trends as certain manufacturing industries that have seen major evolution, such as the automotive and aerospace industries; they are not only confronted with high costs, low profit margins and accelerating competition, but are also facing environmental challenges and general macroeconomic and financial circumstances such as energy cost, and exchange and interest rates. Some consultants assert that, with 45% of the cost of an automobile controlled by suppliers, the success of the automotive industry is rooted in the establishment of key partnerships [11]. In the forest industry, wood procurement costs account for an average of 60% of the total production cost [12], which leads us to believe that efficient management of procurement activities is key to improving competitiveness of the forest products industry.

Since the early 2000s, car manufacturers have evolved to a tiered supply chain model where they have close and privileged ties with suppliers. They found it profitable to outsource certain components mainly because the suppliers would be able to cope with part of this complexity, achieve economies of scale, develop technology expertise, and lower labor costs. In many cases, manufacturers received better service from external suppliers than from internal suppliers [13]. Today, *Tier 1* suppliers are identified as “system integrators” and the general business relationships are as illustrated in Fig. 2 (right). These business relationships can only be established if collaborative business models are developed.

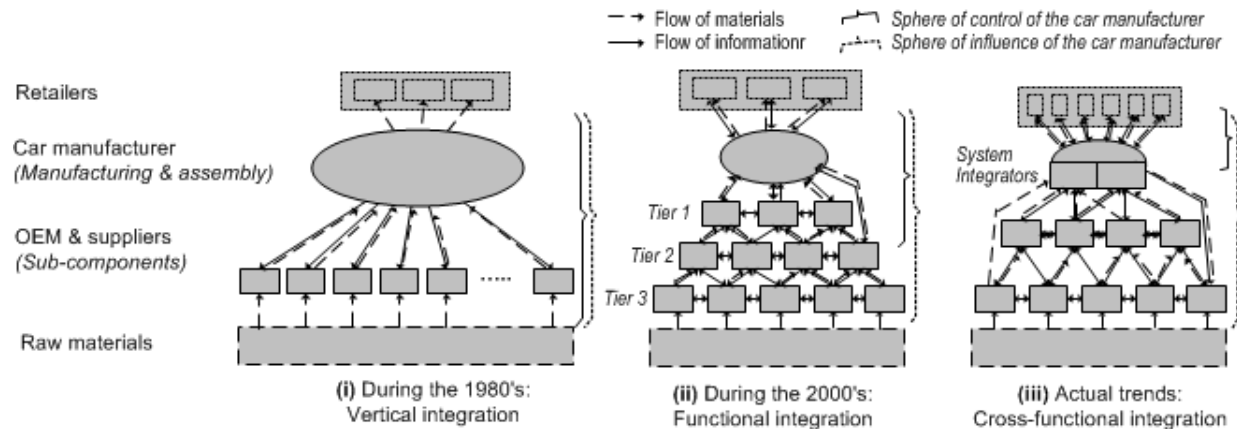


Fig. 2 - Structures of the automotive industry during the (i) 1980's, (ii) 2000's and actual trends (adapted from [14]).

The complexity of the FVC has recently been well documented [15]. We believe that the benefits of intermediation in the manufacturing sector should be transposed to the forest products industry. However, specific challenges related to land ownership and contractual agreements must be acknowledged.

Public Forest Tenure in Quebec and in other jurisdictions

The current tenure system for public forest in Quebec is similar in many ways to the tenure system in other Canadian jurisdictions. Note that a new tenure system has come into effect in the spring of 2013, which we discuss later. The forest is divided into management units (MU). The government is responsible for allocation of timber volume to mills through timber licenses (TL). A TL specifies the general areas from which wood for the mill can be procured and maximum procurement volume for one or more tree species. A mill may hold a TL on more than one MU, and several TLs may be awarded to different mills on the same MU (whether or not the mills are under the same ownership), even for the same tree species. The mill must pay the corresponding stumpage fees based on volume and type of wood delivered. To supply its mills, a company is typically involved in several levels of forest planning (i.e., 25-year strategic plan, 5-year tactical plan, and 1-year operational plans). It must coordinate its operations in several MUs with those of other companies. It is frequent for several mills to be allocated TLs on the same forest area, which may lead to failure to realize full value-creation potential [16]. An agent (typically a major TL holder) is responsible for planning and execution of procurement activities for all TL holders on a given MU. This agent is referred to as the *management mandatory*. The management mandatory may elect to designate another agent for the execution of procurement activities. This execution agent is then referred to as the *operations mandatory*. In general, the *management mandatory* acts in close collaboration with the *operations mandatory* to integrate the needs of the different mills and ensure their supply. The management mandatory is usually determined by peer appointment (other TL holders). With this approach, the FPC (TL holder), typically the largest in the region, is at the same time a beneficiary and an intermediary, and thus is in an apparent conflict of interest. The main source of conflict involves determination of transaction prices for procurement services among the various companies. There are several situations where transaction prices do not reflect a fair market value of the wood allocated to the different mills or beneficiaries. A description of these situations is presented in [17]. Consensus may be reached, but often at the expense of certain TL holders [18].

While the intermediation form described above is frequently encountered in Quebec, several other forms of intermediation in the forest products value chain have been implemented in other jurisdictions. Table I gives an overview of these forms and provides examples from North-America. In general, the intermediaries offer a variety of services including technical, commercial, financial, computer training, and consulting services. However, they are oriented toward the production of fiber with the ultimate goal of maximizing profits for forest products companies. In intermediation forms 2, 3 and 4, the decisions appear

not to be taken in a global context, thus economies of scale and/or network economies may not be realized.

Table I - Observed forms of intermediation in the forest products value chain in North-America.

Intermediation form	Main role of the intermediary	Examples
Organizations created by some manufacturers that hold TLs on the same MU.	Acts on behalf of the manufacturers, managing their TLs and assigning the operations to a forest worker cooperative. The costs for the silviculture treatments are shared based on the volume of resource allocated to each manufacturer.	Gestion FORAP
Companies that work in close cooperation with the government.	Responsible for allocating and managing contracts with entrepreneurs, for execution monitoring and control and, ultimately, for the accountability for the technical and financial projects.	Rexforêt (rexforet.com)
Groups of general contractors.	Specialize in timber supply (harvesting, road construction, transport). Execute plans submitted to them or develop their own.	Gestion Rétabec (www.remabec.com)
Cooperatives created and operated by groups of forestry workers.	Provide different forms of timber, forest planning, forest management and production of plants. May develop a strategic alliance with the FPCs that hold TLs at a specific MU (managing totally or partly the MU; carrying out all activities related to forestry, including road construction and silviculture; representing its clients at various stakeholders and government authorities).	Coopérative Forestière des Hautes-Laurentides (www.cfhl.qc.ca)
Privately held forest and timberlands management services companies.	Provide a variety of forest resource and management and timberlands services for the long term sustainability of private forests and timberlands. May provide consulting services in the acquisition and sales analysis, forest inventory, forest land appraisals and valuations, conservation and regulatory compliance, timber supply modeling, growth and yield modeling, GIS mapping and market studies.	Seven Islands Land Co., Prentiss & Carlisle, Orion Timberlands, Huber Resources, Canal Wood.

The new forest tenure system implemented in Quebec aims at increasing local participation in all levels of forest management planning, shifting harvest planning responsibility from industry to government planners, and adding an auction process to complement the existing timber licence (TL) scheme for allocation of fiber to industrial clients. It also increases government involvement in timber procurement activities, and increases requirement to consult and collaborate with local, regional and First Nations stakeholders in the forest planning process. However, it is not clear how these measures can be effectively implemented in practice and how they may affect operational efficiency. For example, issues related to the sharing of costs engaged because of shared logistics remain major sources of confusion for all the actors involved in the forest-products value chain. The role played by forest entrepreneurs under the new tenure system remains unclear. In fact, entrepreneur performance has always been oriented towards production efficiency and cost reduction [19]. Thus, they may find it particularly difficult to adjust to

the new forest planning environment. It is not uncommon to observe three levels of suppliers (general entrepreneurs, contractors and subcontractors). These levels are repeated in distinct FPC on the same MU.

METHOD

We define a structured process for the definition of a strategic vision of the intermediary agent. We then applied this method with a panel of experts. The output of this application is presented in the Results section.

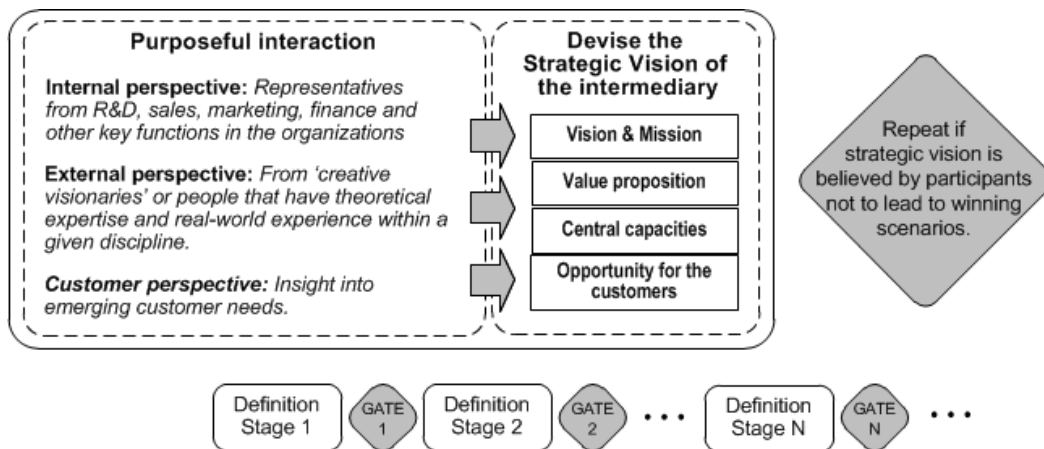


Fig. 3 - Intermediary definition process.

Our structured process takes the form of an iterative series of focus group interviews. At each stage of the process, the strategic vision is refined and enriched, concept viability (from socio-economic and technical points of view) is evaluated, and a decision is made to whether another stage is needed (Fig. 3). The focus group interviews induce purposeful interaction among potential business partners, forest stakeholders and the government representatives. The activities of the intermediary should be designed in such that they help the intermediary's partners and customers achieve their objectives (or meet their needs). To reach this design goal, the definition stages involve small groups of people representing potential partners and customers of the intermediary (Fig. 3). These people are requested to adopt an outcome-driven mind-set. They should creatively explore several scenarios. They should also ensure that this process of creative exploration would converge on a strategic vision of the intermediary so that this intermediary creates a winning scenario for every stakeholder. This is why we refer to this method as the outcome-driven approach to intermediary definition.

At the start of each definition stage, the moderator of the interview (a member of the research team) introduces the subject to the group members, presents the results of the previous definition stage, explains the fundamental principles for the debates, and invites the participants to react to the presented material and to talk to one another by asking questions and commenting on each other's points of view. The group members are urged to think creatively and critically, to expand their points of view, share their concerns, and engage in a debate to reconcile differences. The moderators use their expertise on the subject to ask questions that bring the group members to come up with ideas on what they want the intermediary to do for them and on how the definition of its strategic vision should be improved. As the interactions evolve, an assistant to the moderator takes notes to document the refinement of the strategic vision of the intermediary. Throughout the process, the moderator builds on previous expertise, based on literature readings and experience. This preunderstanding influences the way the research team interacts with people and conducts reporting activities, which may introduce a bias in the results. To help reduce this bias, three researchers with different backgrounds moderated the interviews: a value chain expert, a forestry operations expert, and a multidisciplinary researcher.

Another potential source of bias is the focus group members. Participants will tend to adopt a perspective that focuses primarily on the interests of their own organization. One way to mitigate this bias is to select participants from different organizations at each definition stage. The moderators also play a key role in the creation of an environment that nurtures different points of view without pressure to plan, or reach consensus. As discussed in the Background section, the moderators achieve this by emphasizing the need for the group members to settle all the issues between themselves, bearing in mind that the intended role of the intermediary is to promote coordination and collaboration. The outcome of these successive definition stages consists in the value proposition of the *IS*.

RESULTS

This section describes results from the application of the outcome-driven approach to define a strategic vision for the intermediary agent in the context of public forest in Quebec. In an attempt to facilitate the implementation of the measures brought by the new forest tenure system, the Quebec Federation of Forestry Cooperatives (QFFC) coined the concept of Integrator-Supplier (*IS*) as follows “...a leading contractor of forestry operations, responsible for a significant part of the operations in the forest management unit (harvesting of timber or of forest biomass, road construction, transport, etc.). It is responsible for optimizing the value chain. As such, the *IS* develops tools that keep it aware of the constant needs of its customers. It satisfies these needs by adapting operations planning in order to capture economies of scale from network for the benefit of all its customers”. We use this definition as the starting point for our application case. It is believed that, in addition to facilitating the implementation of the measures brought by the new forest tenure system, the *IS* is an intermediary that can capture additional value-creation potential. To turn this concept into a structural model that can be applied, it must first be mapped to highlight major interactions and information flow. This description should also include the identification of the processes and functions associated with all concerned actors. We therefore set to define the *IS* using the outcome-driven approach to intermediary definition described in the previous section. The remainder of this section presents the strategic vision of the intermediary, as defined by the outcome-driven focus group approach. The results are subdivided into the following themes: *general observations*, *value propositions*, *core capabilities*, *opportunities*, and *development scenarios*.

General Observations

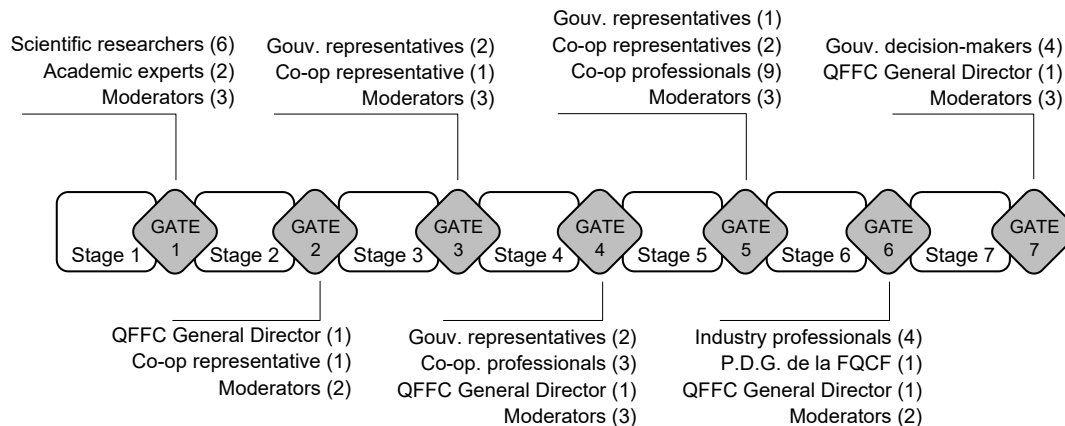


Fig. 4 - Stages conducted to define the *IS* using the Outcome-driven approach to intermediary definition.

Seven definition stages were conducted to define the *IS* using the outcome-driven approach (Fig. 4). Participants include forestry researchers, supply chain specialists, FPC professionals, and government representatives. For all the participants, it was clear that the *IS* should act as a catalyst for collaborative planning and execution of fiber procurement activities, and strive to balance the needs and objectives of all its clients and partners. Its vision and mission were articulated around its role in the achievement of the interests of all the stakeholders, by reconciling planning levels [20], and by optimizing activities related to land use and forestry operations. The *IS* should not only collaborate with stakeholders in the preparation

of these plans but also have a key role in monitoring their execution and ensuring that plans remain valid as changes occur through time. Unlike the automotive sector, where the intermediary links the manufacturer to its tiered suppliers, the forestry *IS* links several land users, provincial government, and regional authorities to a network of suppliers (Fig. 5). Together, these organisations, information and product flow constitute the “*IS network*”.

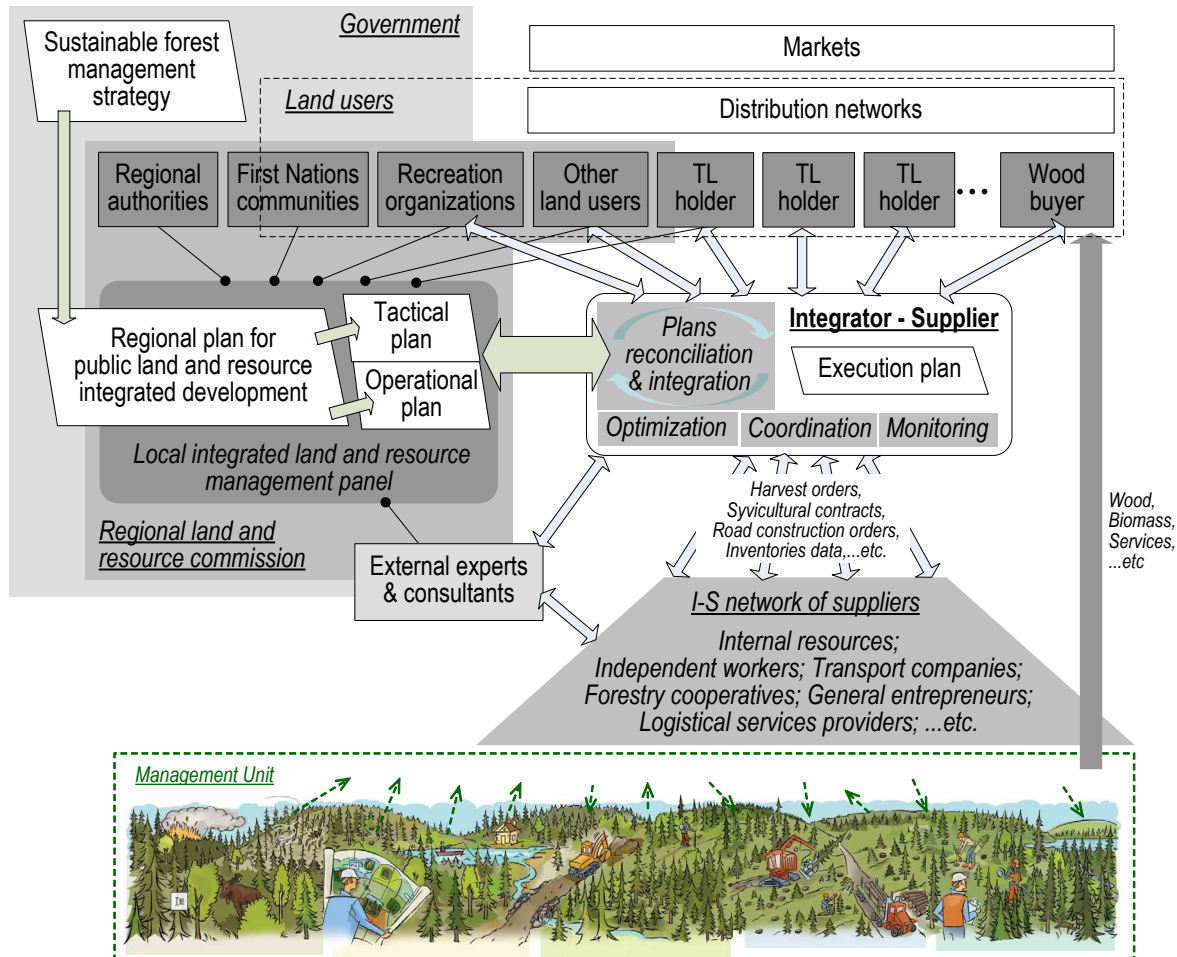


Fig. 5 - Positioning of the IS within the forest products value chain.

Value Propositions

The value created by the *IS* within the network is reflected in the following four value propositions:

P1: Collaborative planning. The *IS* creates a true collaborative planning environment, beyond subcontracting relationships. It facilitates access to best practices, thus improving ability to meet quality, delivery and productivity goals. The *IS* ensures compliance with sustainability guidelines, while maximizing realization of value-creation potential.

P2: Integrated production and services. The *IS* and its network of suppliers are the extension of the value chain to the forest. They improve the regularity of supplies to the factories. The *IS* coordinates and facilitates forest entrepreneurs and workers mandates so that products are delivered to mills in compliance with the quantity, timing and quality constraints.

P3: Competitive value/cost ratio. The *IS* supplies several customers. The operating costs, including the cost engaged because of shared logistics, are spread over a large volume of wood. However, the *IS* does not have a monopoly on the supply of the processing plants. It remains in competition with other

integrators, FPCs that choose to realize their procurement operations independently and, of course, private forests and wood imports.

P4: Certified products and services. The *IS* delivers certified products and services (through proper programs such as ISO, SFI, FSC certification, etc.). It makes available information on the entire traceability chain of the wood delivered by the suppliers in its network.

Core Capabilities

To succeed in its role and be viable, the *IS* must bring a comprehensive mix of competencies. The following core capabilities (C) have been identified:

C1: Building a network integrating different customers and stakeholders. The *IS* sets up a business process built on inter-firm coordination for fulfilling orders (or requests for activities) and for the distribution of goods, services and information. The *IS* balances the interests and ambitions of all stakeholders.

C2: Optimization and synchronization. The FPCs are facing variable market dynamics, more stringent regulations and high customer expectations about price and quality. Notably, demand management requires a multi-level approach that involves every link in the supply chain. This can be very complex for FPCs in a competitive setting. The *IS* is well positioned to facilitate this task. It synchronizes execution plans with the demand plans of all its customers allowing them to increase the responsiveness of their production systems and to lower their inventory levels and their work-in-process. Changes in demand have a direct impact on forest operations. The fact that the *IS* serves several clients at the same time could mitigate the effect of these changes on plan stability. Being a mandatary acting on the behalf of the FPCs and taking on the management of their TL, the *IS* prepares an optimized execution plan that considers logistics aspects including road networks to access cutting areas as well as the availability of forest camps, supplies, and production equipment maintenance in the forest. In addition, it addresses critical aspects for the FPCs such as their production schedules. This cross-chain coordination would generate significant economies of scale. As shown by D'Amours and Rönnqvist [21], the FPCs need to work together in order to lower their costs, and the best way to do this consists in pooling supply and demand, and in looking for a solution that lowers overall cost. The *IS* is responsible for the equitable sharing of performance gains.

C3: Conciliation of execution between tactical and operational planning levels. The *IS* becomes a node of information that is critical for the management of all the inconsistencies that result from the aggregation and disaggregation of information among the plans made at the tactical, operational or execution levels [22], or from the integration of data provided by different organizations.

C4: Supplier development. The *IS* selects its suppliers based on expertise and level of service offered. It monitors supplier performance and helps them improve their capabilities. It supervises their technological progress, monitors their product quality approaches and management practices, and supports implementation of new technology.

C5: Logistic services. The *IS* provides and maintains an infrastructure network for logging, refueling and servicing heavy equipment in the forest. It promotes the exchange and sharing of resources (e.g., log yard) that can help improve performance.

C6: Data acquisition and management. The *IS* collects and manages data on forestry activities. The data is transformed into information and knowledge to monitor and pilot the wood supply chain.

Opportunities

Table II summarizes key opportunities created by the *IS* for its customers and partners. One of the most important opportunities created by the *IS* for all the actors in the value chain is the possibility to exploit network economies of scale as part of their operations. Being positioned as an information, technical, and expertise hub, the *IS* can allow parties to make inter-block compromises and investigate different

negotiation strategies that could permit the creation of greater wealth from the same set of blocks. For instance, the compromises could be related to the positioning of the harvest block separators, the allocation of the cutting blocks, or the use of the existing infrastructure (roads, bridges, firebreaks, etc.). On the other hand, the negotiation strategies could be related to use of financial incentives in order to seek agreements for the volumes on blocks considered unprofitable to one of the parties [17]. Another important opportunity brought by the *IS* is participatory management. For the different stakeholders or actors in the value chain, and especially those suffering from poor social image or credibility, the *IS* offers the possibility to improve their public image or to meet the requirements of government legislation, for instance on social responsibility or value sharing.

Table II - Opportunities created by the IS for its customers and partners.

Forest products companies	Forest entrepreneurs and forestry workers	Government	Community groups	Other land users
Economies of scale	Economies in technical personnel and equipment	Participatory management	Regional development	Economies of scale
Fewer interlocutors	Sole and well known client	More value from the forest	Stable and quality jobs	A neutral and accessible entity
Better risk management	Better guarantee of work and therefore more stable	Innovation		
Improving their image	Wealth of information and a single node for information exchange	Socio-political benefits		
Focus on core business	More autonomy and capacity for initiative			
Better response to the demand				
Access to best practices				

Development Scenarios

The need for an *IS* in the FVC has been discussed in the previous sections. We report and analyse here three issues that seem the most critical for the development of *IS* in the forestry sector on public land. For each issue, possible scenarios for implementation are identified:

Issue 1 – Who can become an IS? This question can be answered simply by determining from the FVC which actors have (or are entitled to have) the *IS* core capabilities or competencies set out previously. These entities must adjust their relations with all others in their environment. Three models emerge from Fig. 5: (i) the *IS-Operator (IS-OP)*, (ii) the *IS-TL holder (IS-TL)*, (iii) the *IS-Administered by the government (IS-GOV)*, and (iv) a new player (*IS-NP*).

In the *IS-OP* model, the integrator-supplier is a member of the network of suppliers, for example, a forest worker cooperative or a general contractor. It is characterized by its proximity to the forest and the wood users or processors; its thorough knowledge of the territory; its social image or credibility; contribution to the development of the community in which it is anchored; extensive expertise and experience in planning; and organizational structure that facilitates decision-making.

The *IS-TL* can be seen as the continuity of the mandatory model under the current tenure system. The *IS* can be mandated at the same time for management and operations activities. It needs to integrate and reconcile its interests and activities with those of other land users in accordance with the framework

established by law. This model of *IS* remains well positioned for the development of most of the core capabilities required, however, it may be resented by a portion of the population that opposes the management of public forest by an integrator that belongs to the FPCs family. In the context of public land management, it is believed that a significant share of the population would agree that government becomes the intermediary (*IS-GOV* model). The government, through its representatives at the regional level, becomes responsible for the reconciliation and integration of the plans as well as optimization, coordination and supervision of the execution on the ground. Concerns expressed by specialists regarding government involvement refer to its lack of operational flexibility, its bureaucracy and its lack of experience in wood procurement planning and operations.

There are also other members of the FVC that could fulfill the role of *IS*. The common actors in the FPC (the TL holders, the members of the network of suppliers and the government) can indeed decide to identify a new player that shall develop the mix of competencies of the *IS* as defined previously. This player could be a consultant or a logistical service provider (a 4PL or a 3PL). The consultant could be active in the forestry sector or in the information technology sector. In the latter case, the consultant would partner with forestry specialists and could be responsible for developing and operating innovative information and communication technology (ICT) systems that would automate the processes of the *IS*; facilitate the reengineering or the alignment of the procedures of the *IS* with its clients; and assist the different actors in the FVC to form collaborative and interorganizational relationships. On the other hand, when the *IS* is a provider of logistic services, it should rather be a 4PL than the traditional 3PL.

Issue 2 – Who selects the *IS*? Self-nominated candidates would be unacceptable to many land users and to the population. Therefore, the intervention of a third party is necessary. Two possible courses of action may be developed: (i) supply chain logic, and (ii) public forest management right returned to the government. The first course of action would not be very different from what is practiced by the TL holders (see the *mandatary* model discussed in the background section). The TL holders would elect among them the one who allows the supply chain to fulfill its role for the benefit of all. The danger in such supply chain logic is that the focus would be on the harvesting of wood allocated by the government to the TL holders. However, the latter need to be accountable for many functions other than wood procurement. This might compromise the effectiveness of relationships among the different actors in the value chain including the different land users. The second course of action gives a preponderant role to the land owner, which in the case of public land is the government.

Table III - Criteria for selecting the *IS*.

Socio-economic impact criteria	Legitimacy criteria
Experience in optimizing the wood value chain	Consistency with the strategic profile and the driving force behind the organization.
Cost control.	Absence of conflict and apparent conflict of interest.
Operational agility.	Public perception.
Sensitivity to market signals.	Clarification of roles and synergy.
Ability to valorize the wood fiber.	Accountability and transparency.
Capacity to innovate.	Use of available expertise.
Local impacts and effects on territory occupation.	
Ability in making jobs in the forest more attractive to professionals.	

Issue 3 – According to what criteria is the IS selected? The criteria for selecting the IS, regardless of the adopted model (Issue 1) or possible course of action (Issue 2), are crucial to the development of the core capabilities defined previously. Two sets of criteria are recommended: (i) socio-economic impact criteria (business-oriented), and (ii) legitimacy criteria (political). Table III gives an overview of the suggested criteria. The framework for the evaluation of each criterion would have to be defined.

CONCLUSION

This paper has identified an opportunity to restructure the FVC using intermediaries, and proposed a method in order to define the strategic vision of an intermediary including its value proposition and core competencies. This outcome-driven method was applied to a case study on public forests in the province of Quebec, Canada. The outcome of the case study is a strategic vision describing an *integrator-supplier* who acts like a hub, linking the forest to its users, and streamlining their stakeholder interaction and collaboration. Several development scenarios were identified, describing possible implementations of the IS concept. Focus group participants agreed that the IS concept represents an opportunity to improve the efficiency of the FVC, and proposed that the government entrust to an IS responsibility for reconciling and executing tactical and operational plans. A follow up project should specify, simulate and experiment with the promising concept of IS. More specifically, possible business models for the intermediary need to be developed; an analysis of how the required competencies should be tailored to these business models need to be conducted; and the operational, economic and social viability of the chosen business models for the intermediary as well as for its clients and its suppliers need to be evaluated. Finally, it should be noted that, although our description of the IS concept for forestry was illustrated through a case study on public forest in Quebec, it is believed that the IS concept presented here could be applied to other contexts and jurisdictions, including private forest settings and any conditions where several products and services need to be supplied to several users.

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