TABLE DES MATIÈRES

Page

INTRODUCTION 1

CHAPITRE 1 REVUE CRITIQUE DE LA LITTÉRATURE.....9
1.1 Gestion de risque.....9
1.1.1 Les méthodes de gestion des risques 13
1.1.2 Les facteurs de succès..... 14
1.1.2.1 Identification du risque 15
1.1.2.2 Évaluation du risque 15
1.1.2.3 Contrôle du risque..... 16
1.1.3 Les nouveautés dans la gestion du risque en construction..... 16
1.2 Intégrité.....18
1.2.1 L'éthique en ingénierie 20
1.2.2 Les risques liés à l'éthique dans le domaine du génie et de la construction..... 21
1.2.2.1 Droits humains et sociaux..... 22
1.2.2.2 Conflits d'intérêts..... 24
1.2.2.3 Collusion et corruption 25
1.2.2.4 Évasion fiscale 26
1.2.2.5 Gestion des données confidentielles 26
1.2.2.6 Responsabilité environnementale 27
1.2.3 Les organisations et ouvrages de référence en éthique et conformité 27
1.2.3.1 Third party risk management trends – Dow Jones..... 28
1.2.3.2 NAVEX Ethics & Compliance Third-party risk management benchmark report 29
1.2.3.3 Banque Mondiale..... 29
1.2.3.4 Transparency International Corruption Perception Index..... 29
1.2.3.5 Ethisphere 30
1.2.3.6 TRACE – Bribery risk matrix..... 30
1.2.3.7 Global Slavery Index (GSI) 31
1.2.3.8 Human Freedom Index (CATO)..... 31
1.2.3.9 International Organization for Standardization (ISO) 31
1.2.3.10 UK Bribery act..... 32
1.2.3.11 Foreign Corrupt Practices Act (FCPA)..... 32
1.2.3.12 Human rights watch (HRW) 32
1.2.3.13 Déclaration universelle des droits de l'homme..... 33
1.2.3.14 Financial secrecy index..... 33
1.2.3.15 Sunlight foundation..... 33
1.3 Les partenaires d'affaires.....34
1.3.1 Types de partenariat..... 35
1.3.1.1 Partenariat public-privé..... 35
1.3.1.2 Coentreprise/consortium..... 36

1.3.1.3 Développement d'affaires 37
1.3.1.4 Autres 37
1.3.2 Facteurs de succès et d'échec des partenariats 38
1.4 Conclusion de la revue de la littérature 39

CHAPITRE 2 THIRD PARTY INTEGRITY MANAGEMENT IN CONSTRUCTION ENGINEERING INDUSTRY 41
2.1 Introduction 42
2.2 Literature review 43
2.2.1 Integrity 44
2.2.2 Business partners in the construction industry 45
2.2.3 Risk management 46
2.2.4 Integrity-related risks 47
2.2.5 Factors influencing and predicting risk 48
2.2.5.1 Type of industry 48
2.2.5.2 Contract complexity 49
2.2.5.3 Proximity to public officials 49
2.2.5.4 Type of third party 50
2.2.5.5 Country 50
2.2.5.6 Partner profile 51
2.2.6 Performance analysis 51
2.2.7 Ethical companies 52
2.3 Case study methodology 52
2.3.1 Presentation of the company 52
2.3.2 Current practices in business partner risk ranking 53
2.3.3 Case Participants/Experts 54
55
2.3.4 SWOT and survey analysis processes 55
2.4 Case study results 57
2.4.1 Risk indicators 57
2.4.1.1 Results 57
2.4.1.2 Findings and analysis 58
2.4.2 SWOT 59
2.4.2.1 Results 59
2.4.2.2 Findings and analysis 61
2.5 Discussion 63
2.5.1 Risk indicators 64
2.5.2 SWOT 64
2.5.2.1 Strengths 64
2.5.2.2 Weaknesses 65
2.5.2.3 Positive Developments 65
2.5.2.4 Threats 65
2.6 Conclusion 66
2.7 Acknowledgements 67

CHAPITRE 3 METHODOLOGY TO CONDUCT THIRD PARTY'S RISK BASED DUE DILIGENCE IN CONSTRUCTION ENGINEERING INDUSTRY 69
3.1 Introduction 70
3.2 Literature review 72
3.2.1 Implementing a corporate ethical culture 72
3.2.2 Risk-based due diligence 73
3.2.2.1 Third-Party Risk Management 73
3.2.2.2 Risk-based approach 75
3.2.2.3 Due Diligence 76
3.2.3 Laws and procedures 77
3.2.4 Integrity-Related Due Diligence 78
3.2.4.1 Economic Due Diligence 78
3.2.4.2 Social Due Diligence 79
3.2.5 References for Third-Party Risk-Based Due Diligence 80
3.2.6 Applicability to construction engineering industry 82
3.3 Proposed methodology for risk-based due diligence through a case study in a major construction engineering company 82
3.3.1 Risk model 85
3.3.2 Risk identification 85
3.3.3 Risk Assessment 86
3.3.4 Due diligence 92
3.3.5 Risk mitigation 97
3.4 Discussion 98
3.5 Conclusion 99
3.6 Acknowledgments 100

CHAPITRE 4 DISCUSSION DES RÉSULTATS 101
4.1 Hypothèses initiales et démarche de recherche 101
4.2 Signification des résultats et apport à la recherche 102
4.3 Limitations 103

CONCLUSION 105

RECOMMANDATIONS 107

ANNEXE I : QUESTIONNAIRE PROPOSÉ DANS LE CHAPITRE 3 109

APPENDICE A: MODERN SLAVERY IN CONSTRUCTION ENGINEERING INDUSTRY 113

APPENDICE B: THIRD PARTY ONGOING MONITORING FOR INTEGRITY IN CONSTRUCTION ENGINEERING INDUSTRY 121

LISTE DE RÉFÉRENCES BIBLIOGRAPHIQUES 145

LISTE DES TABLEAUX

Page

Tableau 1.1 Homéostasie VS calibrage 12

Tableau 1.2 Les méthodes de gestion réactives des risques) 13

Tableau 1.3 Les méthodes de gestion proactives des risques 14

Tableau 1.4 Ouvrages de référence en intégrité 28

Tableau1.5 Facteurs de succès des partenariats liés à l'attitude 38

Tableau 2.1 Risks covered by the current business partner compliance tool 54

Tableau 2.2 Points allowed for the score per risk according to the rank 56

Tableau 2.3 Risk indicators importance regarding each risk according to SNC-Lavalin's 14 experts 57

Tableau 2.4 Standard deviation for each score of the Tableau 2.3 58

Tableau 3.1 Risk assessment overall and precise format comparison 75

Tableau 3.2 Due diligence formats 77

Tableau 3.3 References documents for integrity risk assessment and due diligence from international organizations 81

Tableau 3.4 Hybrid format for risk assessment and due diligence 85

Tableau 3.5 Results and content for antitrust & competitio 87

Tableau 3.6 Results and content for corruption & bribery 88

Tableau 3.7 Results and content for human rights 89

Tableau 3.8 Results and content for conflict of interest 89

Tableau 3.9 Results and content for compliance with regulations 90

Tableau 3.10 Due diligence questions for low, medium and high-risk partners 93

Tableau 3.11 Due diligence questions for medium and high-risk partners 94

Tableau 3.12 Due diligence questions for high-risk partners 95

Tableau 3.13 Due diligence based on questionnaires' answers 96

LISTE DES FIGURES

Page

Figure 0.1 Schéma plan du mémoire 6

Figure 1.1 Schéma des principales sections de la revue de la littérature 9

Figure 1.2 Schéma des sous-sections sur la gestion des risques 10

Figure 1.3 Schéma des sous-sections sur l'intégrité 19

Figure 1.4 Compétences transversales du développement durable selon la norme BNQ 21 000 22

Figure 1.5 Schéma des sous-sections sur les partenaires d'affaires 34

Figure 2.1 Demographic data of the respondents 55

Figure 2.2 Research and analytic process 56

Figure 2.3 SWOT results for each risk 60

Figure 3.1 Risk-based approach 75

Figure 3.2 Six steps for third party risk management 84

Figure 3.3 Four steps for risk model design 85

Figure 3.4 Level assessment per risk according to the sum of the scores from table 10 91

Figure 3.5 Conditions for a medium overall partner's risk-level assessment 91

Figure 3.6 Conditions for a high overall partner's risk-level assessment 92

clicours.com

XVIII

LISTE DES ABRÉVIATIONS, SIGLES ET ACRONYMES

BIM	Building Information Modelling
BNQ	Bureau de Normalisation du Québec
CEO	Chief Executive Officer
CHU	Centre Hospitalier Universitaire
CIOB	Chartered Institute of Building
CNESST	Commission des Normes, de l'Équité, de la Santé et Sécurité au Travail
CQDE	Centre Québécois du Droit de l'Environnement
CSR	Corporate Social Responsibility
CUSM	Centre Universitaire de Santé Mcgill
EPC	Engineering Procurement Construction
EPCM	Engineering Procurement Construction Management
FCPA	Foreign Corrupt Practices Act
GDP	Gross Domestic Product
GSI	Global Slavery Index
HRW	Human Rights Watch
ISO	International Organization for Standardization
KSF	Key Success Factor
MOST	Mission Objectives Strategy Tactics
OECD	Organisation de Coopération et de Développement Économiques
OFAC	Office of Foreign Assets Control
OIQ	Ordre des Ingénieurs du Québec
PACI	Partnering Against Corruption Initiative

Clicours.COM

PEP	Politically Exposed Person
PESTLE	Politique-Économique-Technologique-Légale-Environnementale
PMI	Project Management Institute
POC	Policy Oversight Committee
PPP	Partenariat Public-Privé
REM	Réseau Express Métropolitain
SDN	Specially Designated Nationals and Blocked Persons List
SOP	Standard Operating Procedure
SWOT	Strength Weakness Opportunity Threat
TJN	Tax Justice Network
USD	United States Dollars
WBS	Work Breakdown Structure

INTRODUCTION

0.1 Contexte

Les entreprises sont exposées à une pression populaire et législative depuis plusieurs années afin de considérer les impacts liés à leurs activités sur la société, l'environnement et l'économie. Ceci les a forcés à procéder à un changement de culture majeur. De ce mouvement est née la responsabilité sociale d'entreprise. Cette responsabilité vise l'internalisation des principes du développement durable dans les activités de l'entreprise. L'industrie de la construction et du génie-conseil n'est pas épargnée par cette vague de changement. Au contraire, la commission Charbonneau a exposé au grand jour les pratiques de corruption et de collusion de ces organisations au Québec. Des politiques, codes et procédés permettent de dicter les opérations des entreprises de l'industrie et de contrôler les risques légaux, financiers et réputationnels auxquels font face les multinationales. Parmi ces risques, la corruption et l'esclavage moderne affectent particulièrement le domaine depuis plusieurs années. Plusieurs dizaines de millions de personnes sont retenues comme esclaves et les profits générés par ces activités représentent des milliards de dollars annuellement (Global Slavery Index, 2018). La corruption, quant à elle, coûte plus de 3.5 billions de dollars annuellement aux contribuables et victimes à travers le monde. C'est plus de 5% du produit intérieur brut de la planète qui s'envole chaque année (Global coalition against corruption, 2018). Plusieurs personnes ont tendance à penser que ce sont des problèmes inhérents aux pays du Sud ou en développement. Toutefois, on estime que 40% des pots-de-vin sont versés dans des pays avec un indice de développement humain élevé selon l'indice de développement des Nations unies (OECD, 2014a) et on évalue à plusieurs centaines de milliers le nombre d'esclaves modernes en Amérique du Nord et en Europe. Nombreux sont ceux qui se sont indignés face à ce genre d'enjeux lors des dernières années. Une prise de conscience collective permet, peu à peu, de modifier les pratiques et le cadre règlementaire en place afin d'éviter de tels évènements.

Relativement simple à l'interne, la mise en place de ce type de mesure est très complexe à l'externe lorsqu'il y a présence de chaînes d'approvisionnement complexes et de partenaires d'affaires. Ces deux acteurs sont particulièrement présents dans le domaine de la construction

et du génie-conseil en raison de l'unicité de chaque projet. La taille de ces entreprises les force souvent à adopter des procédés et des outils standards afin d'uniformiser la gestion de l'entreprise. Plusieurs unités d'affaires distinctes ont des relations contractuelles avec de nombreux fournisseurs de biens ou de services. Le Québec est hôte de plusieurs sièges sociaux d'entreprises dans ce domaine. Lourdement éclaboussées par les révélations des médias, elles sont maintenant conscientes de l'importance d'être socialement responsable et tentent de contrôler les risques liés à cette responsabilité.

SNC-Lavalin est un acteur majeur international du domaine de la construction et de l'ingénierie. Avec plus de 50 000 employés et des bureaux dans plus de 50 pays différents, SNC-Lavalin possède un chiffre d'affaires avoisinant les 10 milliards de dollars annuellement. La société effectue des projets dans six secteurs d'activité soit pétrole et gaz, infrastructures, énergie propre, mines et métallurgie, nucléaire et ingénierie, conception et gestion de projet. Avec son secteur capital, SNC-Lavalin est également en mesure de financer et réaliser des projets majeurs en mode traditionnel, partenariat public-privé (PPP) et autres. Au Québec, le nouveau pont Champlain, le Réseau Express Métropolitain (REM) et le Centre Universitaire de Santé McGill (CUSM) sont quelques-uns des nombreux projets majeurs réalisés par la société. À la suite des différents scandales impliquant des têtes dirigeantes de l'entreprise en Libye et au Québec, et à l'exclusion des projets financés par la Banque Mondiale pour une période de dix ans, SNC-Lavalin a procédé à un changement de culture majeur à l'interne. Ceci s'est traduit par la création d'un département dédié exclusivement à la protection de l'intégrité. Le département est responsable du code d'éthique et de conduite, des enquêtes internes, des politiques liées à la lutte à la corruption et l'esclavage moderne, de l'outil de conformité des partenaires d'affaires et de toutes autres questions liées à la gouvernance de l'éthique. À la suite de la crise de 2012 et au changement de gouvernance en 2013, les premières politiques touchant directement l'éthique et la première analyse des risques liés à l'éthique ont été effectuées en 2014 par le département. Depuis, le département n'a pas cessé de se consolider avec, entre autres, la présence du chef de la direction sur le conseil de la coalition anticorruption du forum économique mondial, et récemment la nomination par Ethisphere pour le prix Compliance Leader Verification. Malgré les récentes couvertures médiatiques négatives sur

l'entreprise, SNC-Lavalin a bâti un programme de protection de l'intégrité qui fait l'envie de plusieurs firmes de génie-conseil depuis 2014. L'amélioration en continu de leurs outils de conformité et d'éthique leur permet d'éviter que de tels crimes se reproduisent. Dans la foulée de ces évènements, cette recherche vise à contribuer à l'amélioration de l'outil assurant la conformité des partenaires d'affaires.

0.2 Objectifs

L'objectif général de cette recherche est d'améliorer la compréhension et la gestion des risques liés à l'intégrité présents lors des partenariats d'affaires dans le domaine de la construction et du génie-conseil. Plusieurs sous-objectifs ont permis la réalisation de cet objectif.

Le premier objectif spécifique est de comprendre quels risques liés à l'intégrité surviennent lors des partenariats et comment les entreprises peuvent les détecter. En effet, bien que simple à première vue, comprendre l'écosystème d'affaires est nécessaire afin de proposer des solutions adéquates et réalistes pour les entreprises. Gérer des risques qui ne s'appliquent pas à l'entreprise ou qui ne sont pas considérés comme importants dans leurs activités aboutirait en une solution qui n'est pas optimale.

Le second objectif spécifique est d'inclure l'opinion d'experts dans la gestion de l'intégrité. Les entreprises se basent souvent sur des modèles normalisés et parfois peu adaptés à leur réalité. La perception des intervenants pourrait permettre la création d'outils plus complets et sécuritaires. Il est important de déterminer quelles techniques permettent de prendre en compte ces acteurs et l'importance de leur implication en comparant les résultats à la situation actuelle.

Le troisième et dernier objectif spécifique est de proposer une méthodologie pour les entreprises souhaitant concevoir leur propre outil de conformité des partenaires d'affaires. Plusieurs méthodes du secteur financier existent déjà et l'applicabilité au secteur de la construction et du génie-conseil doit être étudiée et validée.

0.3 Hypothèses de recherche

Les hypothèses de recherche sont liées aux différents objectifs de la section précédente. En effet, elles sont au nombre de trois et pourront être vérifiées par l'atteinte desdits objectifs.

Après une brève analyse de l'outil de conformité actuel de la compagnie, la première hypothèse est qu'il serait pertinent de couvrir davantage de risques lors de l'évaluation des partenaires d'affaires dans le domaine de la construction et du génie-conseil. Les modèles normalisés et l'outil de la compagnie en étude de cas couvrent principalement les risques de corruption.

De nombreuses techniques de gestion suggèrent de favoriser les procédés interactifs. Les chercheurs affirment qu'une démarche démocratique est plus éthique que les processus traditionnellement hiérarchique et autocratique. La seconde hypothèse est qu'il serait important d'utiliser un procédé interactif pour définir l'outil de conformité des partenaires d'affaires.

Finalement, le secteur financier est beaucoup plus mature en termes de gestion des risques éthiques. La troisième et dernière hypothèse est que les modèles utilisés dans le secteur financier peuvent être utilisés dans la construction et le génie-conseil suite à des changements mineurs.

0.4 Aperçu de la méthodologie

La méthodologie utilisée est l'étude de cas. En effet, la totalité de la recherche s'est déroulée en entreprise et les résultats sont appliqués à celle-ci. Cette méthodologie se traduit par l'étude approfondie d'une situation précise en vue d'obtenir des connaissances et de proposer des solutions ou de bonnes pratiques. L'étude de cas se compose d'observations, d'entrevues et d'études des documents (livres blancs, procédures, références, etc.). Les modèles trouvés sont discutés afin de les lier ou les limiter aux autres cas possibles (différentes entreprises dans le même domaine). Compte tenu du faible volume de recherche en la matière, cette méthodologie permettra d'avancer certaines théories qui devront être vérifiées par d'autres recherches. L'étude de cas peut être réduite à un très petit échantillon. Les données sont ensuite analysées

et classées selon des thèmes communs afin d'obtenir une synthèse globale du cas (Garnier, 2018).

0.5 Plan du mémoire

À la suite de l'introduction, une revue de littérature des thèmes communs sera présentée. Les deux articles suivront et une conclusion avec les recommandations et les limitations de cette recherche complèteront ce mémoire (Figure 0.1).

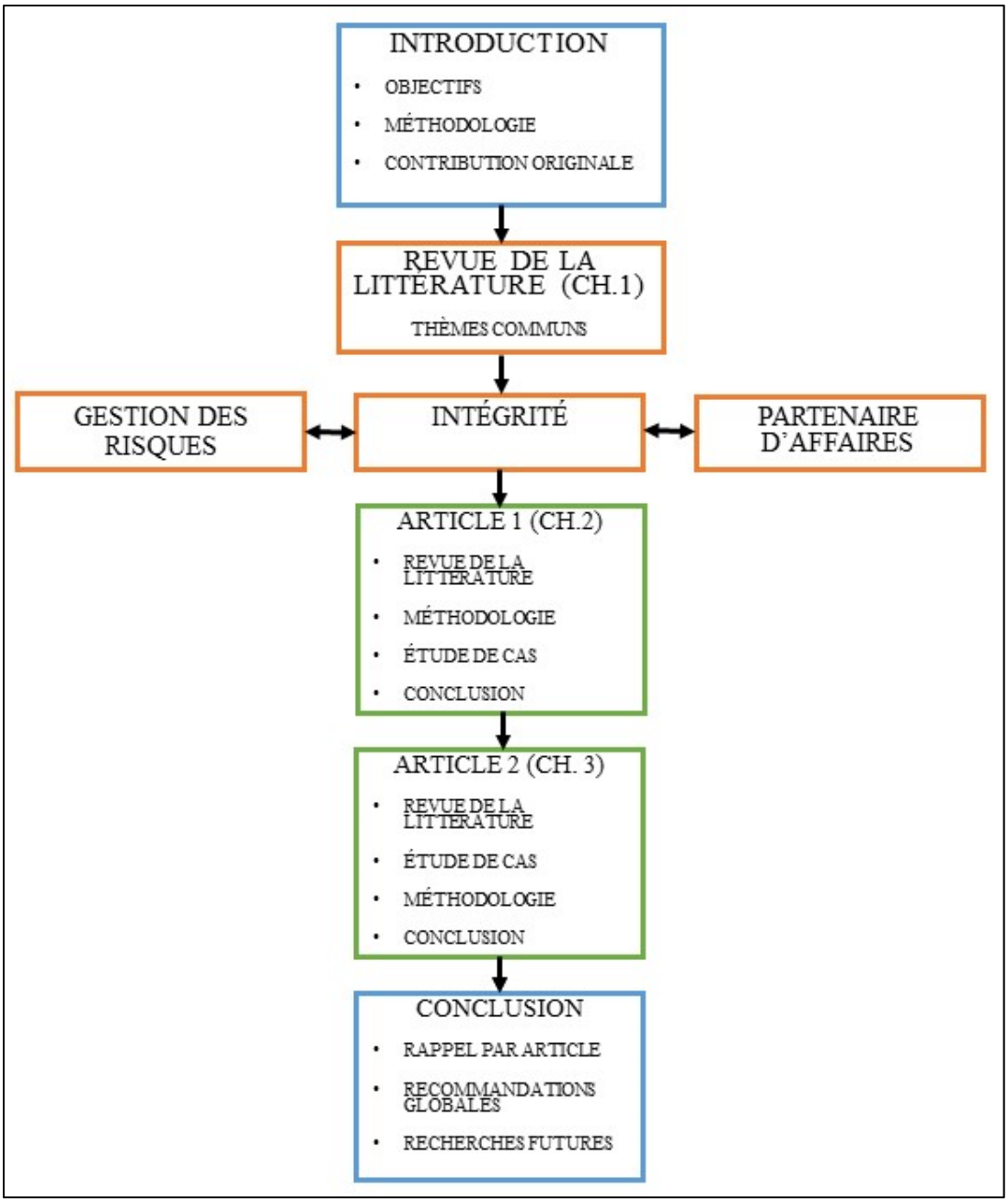

Figure 0.1 Schéma plan du mémoire

Le premier article a pour but d'obtenir un portrait global des risques liés à l'intégrité et de leurs indicateurs ainsi que de démontrer la pertinence d'utiliser un processus interactif pour assurer une saine gestion de l'intégrité. Dans un premier temps, une étude des références académiques, législatives et managériales a permis d'obtenir des connaissances approfondies dans ce sujet. Ensuite, des observations et un sondage envoyé à différents acteurs clés ont permis d'obtenir

le point de vue des experts par rapport à la qualité des différents indicateurs de risque ainsi que sur le procédé actuellement utilisé par la compagnie pour assurer la gestion des partenaires d'affaires. Des failles sont identifiées et différentes pistes de solution sont avancées grâce à cette étude de cas.

Le second article a pour but de proposer une méthodologie pour les entreprises souhaitant concevoir ou améliorer leur processus de conformité des partenaires d'affaires. Dans un premier temps, l'étude des références académiques et managériales dans le domaine de la gestion du risque et de la diligence raisonnable a permis d'obtenir les fondations pour la méthodologie. Ensuite, une proposition de format et de contenu est effectuée par le biais d'une étude de cas et des résultats du premier article. Un outil comprenant les nouvelles connaissances acquises ainsi que le point de vue des experts est avancé.

Le premier appendice aborde l'esclavage contemporain dans le domaine de la construction. Dans un premier temps, les formes d'esclavage moderne et le contexte sont abordés. Ensuite, des pistes de solutions sont proposées pour les entreprises canadiennes souhaitant modifier leurs pratiques en vue de la mise en application du projet de loi fédéral C-423 débutant en janvier 2020.

Le second appendice aborde le suivi à long terme des partenaires d'affaires. Premièrement, les principaux défis auxquels font face les gestionnaires sont présentés et des solutions technologiques sont proposées. Ensuite, une étude de cas permet d'évaluer l'utilisation d'un algorithme simple afin de réduire le nombre de faux positifs générés par les outils automatiques de suivi des partenaires chez SNC-Lavalin.

0.6 Contribution originale

Le domaine de la gestion de l'intégrité est relativement récent. Les entreprises se basent sur des outils et des méthodes provenant de différentes organisations, principalement en lien avec les finances (firmes comptables, courtiers financiers, etc.). Aucune recherche scientifique n'a

clicours.com

proposé de méthodologie propre aux firmes de génie et construction. Dans le domaine du génie-conseil et de la construction, les partenaires sont nombreux en raison de l'unicité de chaque projet. Les risques inhérents aux partenariats d'affaires dans le contexte du génie ou de la construction sont différents des risques présents lors de fusion ou d'acquisition de compagnies. Malgré l'existence de compagnies privées qui annoncent vendre des services à des entreprises en tout genre pour les risques liés à l'intégrité, plusieurs failles demeurent et des recherches académiques permettront de confronter et améliorer les systèmes proposés. La contribution de l'auteur est la proposition d'une méthodologie propre aux entreprises de construction et de génie-conseil pour la création ou l'amélioration d'un outil permettant d'assurer la conformité éthique des partenaires d'affaires.

0.7 Aperçu des limites

La gestion de l'éthique et de l'intégrité dans le domaine de la construction et du génie-conseil en est à ses débuts. En effet, la majorité des petites et moyennes compagnies possèdent peu de ressources attitrées à cette problématique, voire aucune dans plusieurs cas. Les compagnies majeures faisant preuve de leadership sont quant à elle souvent dans un processus de rédemption qui les oblige à modifier leurs pratiques à la suite d'inconduites. Ces faits limitent grandement le nombre d'experts pouvant participer à ce type d'étude et affectera la représentativité de l'échantillon choisi à l'intérieur d'une compagnie ou du domaine. Il est donc impossible de tirer des conclusions statistiquement valides et ce travail se pose plus comme une réflexion et propose des pistes de solutions aux problématiques des partenaires d'affaires dans le domaine de la construction et du génie-conseil.

CHAPITRE 1

REVUE CRITIQUE DE LA LITTÉRATURE

La revue de littérature présente trois thèmes communs propres aux deux articles. La gestion du risque, l'intégrité et les partenaires d'affaires dans le domaine du génie-conseil seront abordés afin d'introduire les résultats de cette recherche.

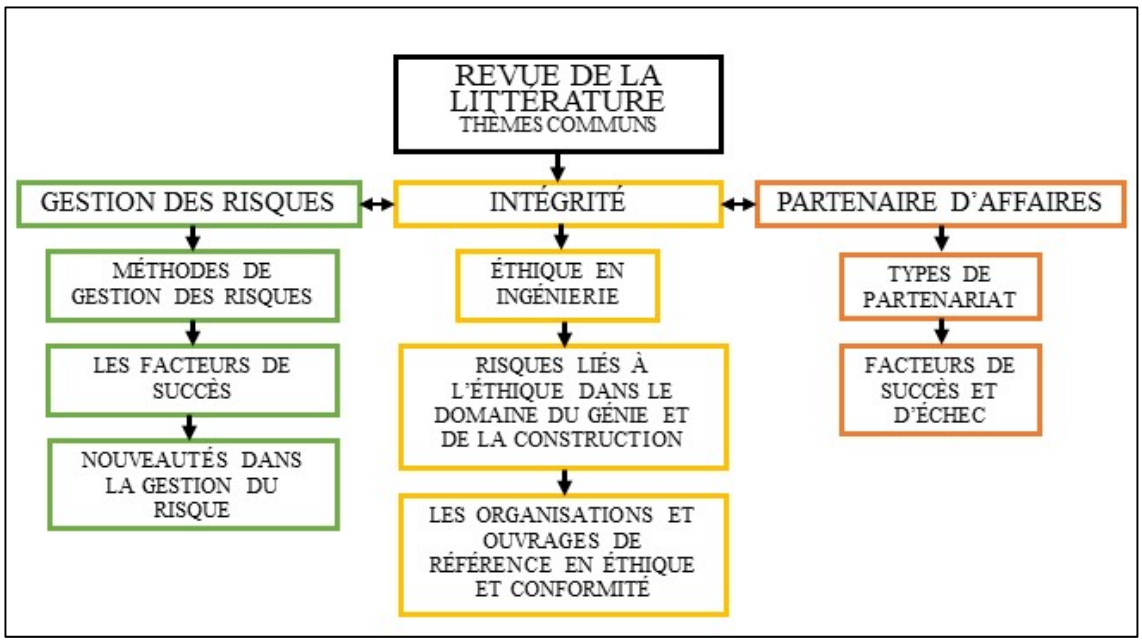

Figure 1.1 Schéma des principales sections de la revue de la littérature

1.1 Gestion de risque

De nombreuses méthodes existent afin de gérer les risques dans le domaine de la construction. Certaines de ces méthodes seront explorées (Figure 1.2) et sont basées sur des fondements mathématiques solides, l'expérience des experts et des modèles de gestion des risques complexes.

Clicours.COM

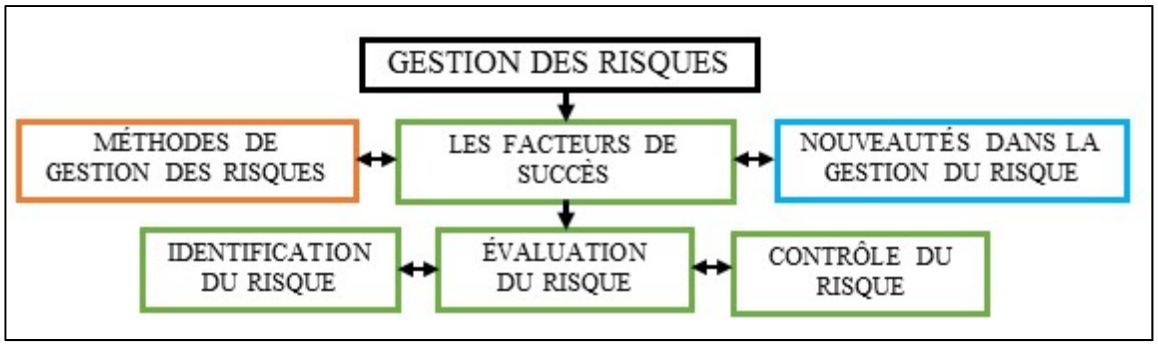

Figure 1.2 Schéma des sous-sections sur la gestion des risques

Plusieurs définitions existent pour le risque. Le terme est souvent associé au danger ou à l'incertitude. Certains définissent le risque comme étant composé de trois éléments (Al-Bahar & Crandall, 1990) :

Évènement : Ce qui peut arriver en faveur ou au détriment du projet;

Incertitude : Les chances ou la probabilité que l'évènement se réalise. Un évènement avec une probabilité de 100% n'est pas un risque, même s'il peut créer des impacts négatifs ou positifs pour le projet;

Conséquences potentielles : Un risque doit présenter des conséquences positives ou négatives potentielles afin d'être considéré comme tel.

Également, certains le définissent comme étant le produit de la probabilité et de l'impact (Abdelgawad & Fayek, 2010).Il est important de différencier la probabilité et l'éminence d'un risque. En effet, malgré une probabilité équivalente à 0.01%, un risque éminent peut être considéré comme très élevé.

Au départ, la gestion du risque dans la construction était très semblable aux analyses effectuées par les compagnies d'assurance (Ashley & Bonner, 1987). Les gestionnaires géraient les risques dits volontaires, associés directement à leurs contrats et aux lois les entourant (Martin Loosemore, 2006). Toutefois, les risques dits involontaires, associés

aux autres parties, à la morale et autres n'étaient pas gérés. Plus tard, des experts ont modifié l'approche de gestion en incluant des risques qui sont considérés comme non assurables. Le domaine de la gestion n'a pas cessé de se développer depuis. La définition de la gestion des risques est toutefois demeurée la même depuis sa création (Al-Bahar & Crandall, 1990).

« Un procédé ordonné pour systématiquement identifier, analyser, et répondre aux risques afin d'obtenir un contrôle optimal ou acceptable desdits risques. »

Deux courants de pensées majeurs sont présents dans la gestion des risques : l'homéostasie et le calibrage. Ils sont expliqués au tableau 1.1 (Hood & Jones, 1996). D'ores et déjà, trois étapes distinctes sont définies : identification, évaluation et contrôle. Elles seront abordées dans une section subséquente de ce document.

Tableau 1.1 Homéostasie VS calibrage
Adapté de Hood & Jones (1996)

Concept (Homéostasie)	**Explication**	**Concept inverse (Calibrage)**	**Explication**
Anticiper	Prévenir. Appliquer les connaissances et apprendre du passé pour prendre de meilleures décisions	Réaction	Les échecs ne sont pas prévisibles. Trop de prévention donne un sentiment d'invincibilité
Responsabiliser	Trouver les causes (coupables) des imprévus	Dispenser	Ne pas chercher la cause afin de favoriser le travail collaboratif
Quantifier	Favoriser la compréhension au travers des chiffres. Rationnel et systématique	Qualifier	Les poids doivent être ajustés pour des critères de nature qualitative
Connaissances	Compréhension des facteurs influençant le risque. L'approche cause à effet est efficace en ingénierie	Absence de connaissance	Limitations majeures dans la compréhension des facteurs qui influence les risques
Indépendance	La sécurité doit être traitée à part des autres objectifs	Interdépendance	Tous les objectifs doivent être traités ensemble
Confiner	Discussion plus efficace entre experts	Consulter	Communication élargie valide les impressions et évite les erreurs
Structures et produits	Le risque est contrôlé par des structures. Des systèmes permettent d'atteindre les objectifs	Procédés et personnels	Changer la manière de penser et sensibiliser en mettant l'accent sur la gestion du risque

1.1.1 Les méthodes de gestion des risques

Les gestionnaires déterminent les suppositions et les possibilités d'évènements qui pourraient éloigner l'organisation de ses objectifs (gestion proactive). Malgré une gestion efficace en amont, certains risques surviennent lors des prises de décision et sont parfois inévitables ou imprévisibles selon le stade de maturité du projet ou de l'entreprise (gestion réactive) (Martin Loosemore, 2006). La gestion des risques optimale est en grande partie proactive. Les différentes méthodes de gestion des risques sont montrées aux tableaux 1.2 et 1.3.

Tableau 1.2 Les méthodes de gestion réactives des risques
Adapté de KarimiAzari & al. (2011) et Martin Loosemore (2006)

Éléments	**Description**
Inspections	Audit et inspection afin de trouver de possibles menaces
Liste petite problématique	Plusieurs petites problématiques peuvent entraîner des problèmes majeurs
Rencontres	Discuter de la gestion et des systèmes en place pour les risques
Industrie	S'assurer d'être à jour par rapport à l'industrie
Automatisation	Implanter de la technologie pour la détection (valable pour les risques physiques)
Enquêtes	Apprendre des erreurs et modifier en conséquence

Tableau 1.3 Les méthodes de gestion proactives des risques
Adapté de KarimiAzari & al. (2011) et Martin Loosemore (2006)

Catégories	Éléments	Description
Organisation des idées	Listes	À partir des ouvrages de référence ou des projets passés. Méthode la plus courante.
	Division	Sectionner le projet ou autre selon structure de fractionnement (WBS-Work Breakdown Structure).
	Avocat du diable	Introduire une personne extérieure aux opinions conflictuelles et perspectives nouvelles.
	Scénario	Spéculation à propos du futur avec une vision positive ou négative.
	Attribut	Définir des attributs à la décision. Lier ces attributs à des risques.
Prévisions	Extrapolation	L'histoire tend à se répéter, basé sur des données passées.
	Causale	Utiliser des relations de cause à effet pour prédire le futur.
	Normale	Le futur est modelé par les personnes et leurs buts et valeurs.
Autres	Système informel	Cartographier les acteurs clés, les ressources et les contraintes.
	Remue-méninges	Groupe de 10 à 15 personnes dirigé par un responsable.
	Technique Delphi	Semblable aux remue-méninges, mais en ligne. Élimine l'effet d'entraînement du groupe.
	Diagramme	Division du risque selon ses causes ou ses origines. Apparition de nouveaux risques.
	Simulation	Basé sur des équations et de grandes itérations. Possible grâce aux ordinateurs.

1.1.2 Les facteurs de succès

Plusieurs facteurs sont nécessaires pour la mise en place d'un système efficace de gestion des risques en entreprise. L'identification du risque, son évaluation et les mesures de contrôle sont les trois grandes étapes de cette gestion. Le succès des projets est directement lié au succès de l'entreprise et à la manière dont elle est gérée (Cooke-Davies, 2002).

Avant de prendre une quelconque décision, les gestionnaires devraient s'assurer de comprendre et connaître leurs objectifs. Pour ceci, ils doivent obtenir un engagement de l'organisation et effectuer une analyse des parties prenantes en les consultant pour établir des objectifs et des indicateurs de performance (Martin Loosemore, 2006).

1.1.2.1 Identification du risque

L'identification du risque est la première étape dans la gestion des risques. Tous les acteurs doivent y participer. La combinaison de plusieurs analyses est le premier facteur de succès dans l'identification des risques (Gudienė, Banaitis, Podvezko, & Banaitienė, 2014). En effet, les gestionnaires peuvent analyser les anciens projets et leurs échecs/réussites, les interactions entre les intervenants du projet ou de la compagnie, la ventilation des activités du projet ou de la compagnie et des documents de références en lien avec le type de risque étudié (Liu, Zhao, & Yan, 2016). Un second facteur de succès est l'identification des risques positifs pour la compagnie. En effet, ce facteur permet de découvrir des opportunités et est directement lié à la capacité de trouver des risques négatifs (Renault, 2016). Un troisième facteur de succès est de déterminer qui sera responsable de quel risque. Cette responsabilisation permettra de diviser et mieux comprendre le projet. De plus, ce facteur modifie indéniablement l'évaluation et les mesures de contrôle qui seront associées auxdits risques (Iqbal, 2015). Un facteur d'échec est souvent l'absence de vision globale des gestionnaires du risque qui se concentrent presque exclusivement sur les lois et les contrats entraînant ainsi plusieurs oublis (Martin Loosemore, 2006).

1.1.2.2 Évaluation du risque

Plusieurs méthodes permettent une bonne évaluation du risque. Aujourd'hui, les risques ne sont pas seulement une évaluation statistique des impacts au niveau des coûts et de l'échéancier. Une approche holistique de la gestion des risques inclut également les risques associés à la gouvernance d'entreprise. Un premier facteur de succès est d'inclure l'intuition, l'expérience professionnelle, et les jugements personnels pour une meilleure

évaluation des risques (Taroun, 2014). À la suite de l'apparition de nouveaux enjeux liés à la durabilité, un second facteur de succès est l'utilisation de méthodes d'analyse multicritères afin de prendre en compte les aspects sociaux et environnementaux en plus des critères habituels (Bu-Qammaz, Dikmen, & Birgonul, 2009; Esayas, Mahler, Seehusen, Bjørnstad, & Brubakk, 2015). Un troisième facteur de succès est l'utilisation des nouveaux logiciels qui permettent des milliers d'itérations pour une meilleure simulation des risques (Fang, Marle, & Xie, 2017).

1.1.2.3 Contrôle du risque

Le contrôle du risque peut être exécuté de nombreuses manières. Un premier facteur de succès est de choisir une réponse adéquate au risque, en fonction de qui est ou sont le/les responsable(s). Parmi les actions possibles il y a éviter/éliminer le risque, transférer le risque, le réduire, l'exploiter (risque positif), le partager, l'accepter ou l'intégrer dans la contingence (Mhetre, 2016). Un second facteur de succès est lié à l'évaluation de la performance du contrôle de l'entreprise. Pour cela, il est recommandé d'effectuer des audits internes régulièrement (El-Sayegh, 2014).

1.1.3 Les nouveautés dans la gestion du risque en construction

Le triangle de fer est un modèle illustrant les contraintes de la gestion de projet (Larsen, Shen, Lindhard, & Brunoe, 2016). Le temps, les coûts et la qualité sont les trois éléments de ce triangle. Depuis la prise de conscience collective sur les enjeux liés au développement durable, la santé-sécurité et l'environnement font partie des contraintes de la gestion de projet de construction (Abd El-Karim, Mosa El Nawawy, & Abdel-Alim, 2017). Les indicateurs de succès pour les projets de construction sont directement liés au respect de ces cinq contraintes. Elles sont interdépendantes et une trop grande affectation des ressources à l'une d'entre elles entraîne un risque de ne pas atteindre les objectifs pour les autres. Par exemple, afin de rattraper un retard dans les travaux, un entrepreneur pourrait être tenté d'accélérer le rythme d'exécution entraînant ainsi une perte de qualité,

un risque pour la santé-sécurité des travailleurs ou l'environnement, et ultimement des coûts supplémentaires s'il y a des déficiences. Actuellement, la gestion des risques est considérée comme un moyen d'acquérir un avantage stratégique (Zhao, Hwang, & Low, 2015). En effet, les entreprises ne perçoivent pas ce procédé comme défensif, mais comme un moyen d'optimiser leurs ressources et la réussite de leurs projets. La planification avant-projet est reconnue par plusieurs comme le moyen le plus efficace pour réduire l'impact de ces risques et le respect des contraintes (Hwang & Ho, 2012).

La principale nouveauté dans la gestion du risque en construction est l'approche holistique entreprise par la majorité des spécialistes du domaine. En effet, le risque n'est pas considéré seulement à l'échelle d'un projet ou d'une action, mais bien à l'échelle de la compagnie et de tous ses partenaires, fournisseurs, clients et autres. Cette vision permet de mieux protéger les entreprises et comprendre l'écosystème complexe dans lequel elles évoluent (Zhao et al., 2015). La perception de la population est importante et le risque ne doit pas se limiter à une série de données et un groupe d'expert. Par exemple, la sécurité d'une communauté n'est pas seulement liée au taux de criminalité et autres statistiques; elle est liée à la définition même de la sécurité pour cette communauté. La standardisation des procédés a permis d'établir des normes et de développer des techniques mathématiques pour la gestion du risque (Tah & Carr, 2001). Un autre facteur important dans le développement des connaissances et de la gestion du risque est un outil du Project Management Institute (PMI). Le Risk Management Maturity Level Audit Tool créé en 2002 a permis de catégoriser et de noter les organisations selon leur niveau de maturité. L'économie de marché étant ce qu'elle est, les entreprises ont massivement investi dans ce domaine afin d'obtenir un avantage concurrentiel. Ensuite, des logiciels permettant des calculs complexes et un grand nombre d'itérations ont grandement amélioré le rendement et l'efficacité de la gestion des risques. Un développement majeur se situe au niveau du processus du Building Information Modeling (BIM). En centralisant les informations liées à la conception, la construction et l'opération des bâtiments, BIM facilitera grandement la gestion des risques liés aux projets de construction (Zou, Tuominen, Seppänen, & Guo, 2019). Toutes ces méthodes convergent vers une analyse de l'ensemble des activités d'une

compagnie et une approche holistique. Les interactions entre les domaines et les acteurs ainsi que les problèmes liés aux communications et perceptions sont les plus grands enjeux actuellement (M. Loosemore & Cheung, 2015). L'avènement des technologies de l'information et la conscientisation du public aux différents enjeux sociaux et environnementaux ont entraîné l'apparition de nouveaux risques liés à l'éthique, l'intégrité et la conformité des entreprises.

1.2 Intégrité

Les risques liés à l'intégrité sont particulièrement présents dans le domaine du génie étant donné les nombreuses avancées et technologies. L'intégrité est définie comme quelque chose qui a toutes ses parties, qui n'a subi aucune diminution et aucun retranchement (Badaracco & Ellsworth, 1991). L'Ordre des Ingénieurs du Québec (OIQ) définit l'intégrité comme une vertu qui consiste à respecter scrupuleusement les règles de la morale sociale et les devoirs imposés par l'honnêteté et la justice (OIQ, 2018). La définition de l'intégrité n'est pas universelle et fait l'objet de plusieurs débats. Malgré cela, pour les entreprises et les organisations, les risques liés à l'intégrité représentent le risque de ne pas être conforme aux codes qu'elles écrivent et s'imposent. La grande majorité des entreprises possédant une gestion exemplaire de leur intégrité ont développé cette expertise à la suite de scandales les ayant affectés et forcé à modifier leurs pratiques. Récemment, les cas de Odebrecht et Petrofac ont fait les manchettes pour des cas de corruption à très grande échelle dans le domaine de la construction et du génie-conseil sur plusieurs continents à la fois (Gallas, 2019). Les cas en lien avec la compagnie Fluor et SNC-Lavalin ont également fait l'actualité dans le passé et ces deux entreprises sont désormais reconnue par Ethisphere, une organisation évaluant et récompensant les entreprises éthiques, pour leur gestion exemplaire grâce à leur département d'intégrité (Lu, Ye, Flanagan, & Ye, 2016). En entreprise, ces départements sont responsables de rédiger le code d'éthique et de conduite, et d'appliquer des mesures afin d'assurer le respect du code à l'interne comme à l'externe. Des représentants du département sont présents dans les différentes unités d'affaires de la compagnie afin de soutenir les employés dans

l'application des mesures (O'Neil, 2017). Les sous-sections de cette revue sont présentées à la figure 1.3.

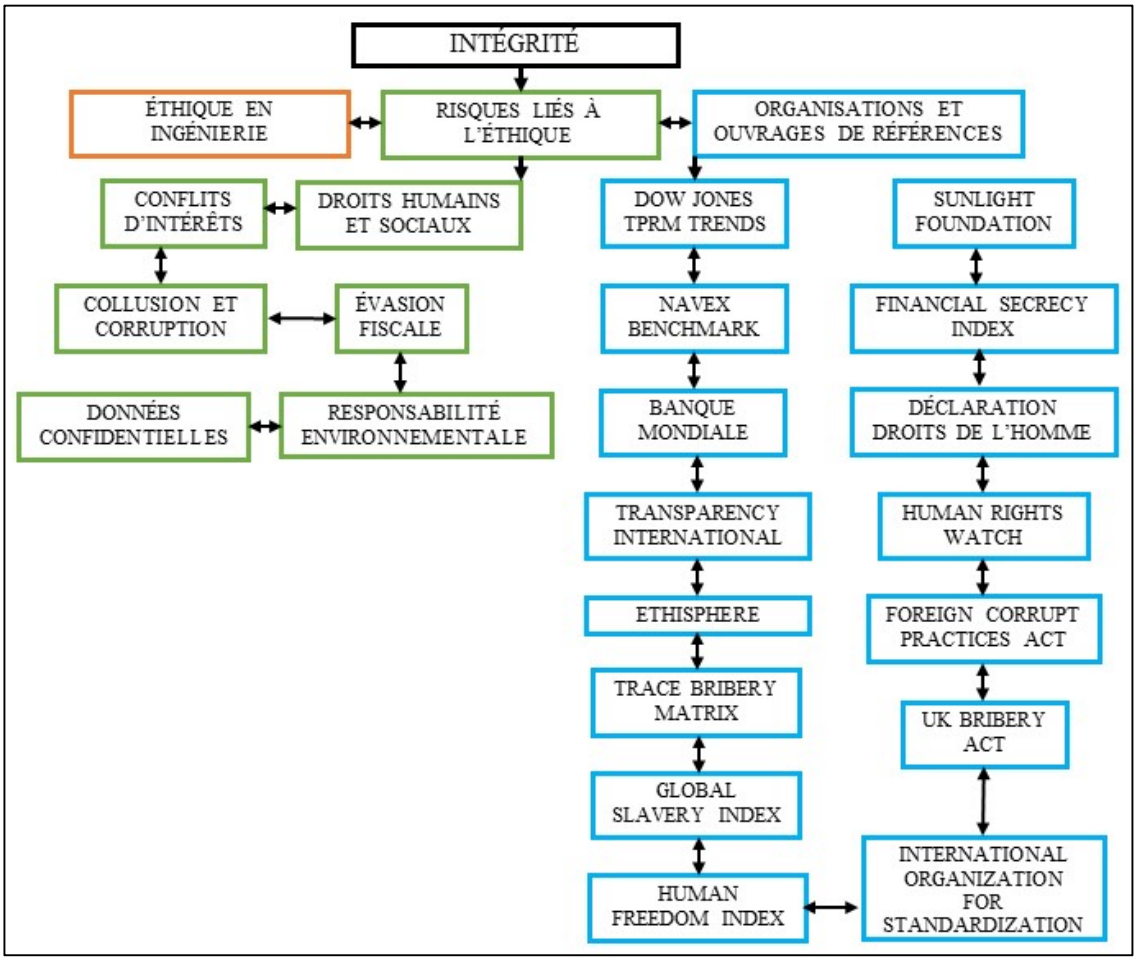

Figure 1.3 Schéma des sous-sections sur l'intégrité

Plusieurs critiquent la formation de l'ingénieur qui est jugée comme ethnocentrique (Guntzburger, Pauchant, & Tanguy, 2018). En effet, plusieurs chercheurs affirment que les étudiants en génie ont de la difficulté à analyser un problème sous plusieurs perspectives. Ils suggèrent l'intégration de cours liés aux sciences humaines et sociales dans la formation d'ingénieur. Ce manque entraînerait des prises de décisions douteuses pour les communautés et l'environnement et serait à l'origine des grandes bavures médiatisées liées au génie (Coeckelbergh, 2012). Ces bavures sont synonymes de

Clicours.COM

conséquences importantes du point de vue de la réputation et des finances pour les entreprises. Afin de pallier ceci, elles rédigent des codes de conduites et d'éthique. Les normes, politiques, règlements et valeurs de l'entreprise y sont inscrits afin d'assurer une gestion uniforme des projets (Adelstein & Clegg, 2016).

1.2.1 L'éthique en ingénierie

L'éthique dans le domaine du génie peut être divisée en trois catégories, l'éthique du dialogue, des émotions et de la complexité (Guntzburger et al., 2018).

L'éthique du dialogue encourage la prise en compte de l'autre, son opinion et valorise la diversité des perspectives lorsqu'il y a une prise de décision importante à faire (Roeser, 2010). Ceci implique que l'évaluation et la perception du risque ne sont pas seulement l'affaire des professionnels et rejette l'idée qu'une perception biaisée et émotionnelle ne doit pas être incluse dans les délibérations.

L'éthique des émotions affirme que les émotions doivent être prises en compte lors des décisions. En effet, la pensée rationnelle fait également appel aux émotions de façon intuitive (Roeser, 2012). La peur, le dégoût, l'empathie et la compassion sont nécessaires afin d'avoir une saine réflexion éthique.

L'éthique de la complexité rend la notion d'incertitude acceptable lors de la prise de décision éthique. En effet, les méthodes traditionnelles sont très linéaires et ne peuvent pas être complètement valables dans une société complexe comme la nôtre (Preiser & Cilliers, 2010). Ceci implique une responsabilisation et une modestie face aux incertitudes, sans toutefois empêcher l'avancement ou la prise de décisions.

Afin de reconnaître et gérer des enjeux éthiques, une compréhension approfondie des valeurs universelles de l'éthique est nécessaire. L'intégrité, l'honnêteté et l'équité seront utilisées afin d'établir les enjeux et d'avoir une discussion et un consensus en se basant

sur ces trois valeurs (O.C. Ferrell, 2015). Le processus interactif et participatif est nécessaire pour une saine gestion de l'éthique et la prise en compte des émotions. Aussi, il est important de ne pas suivre aveuglément ce processus qui sera amené à évoluer à travers le temps d'où la notion de responsabilisation (Bonn & Fisher, 2005).

1.2.2 Les risques liés à l'éthique dans le domaine du génie et de la construction

Les différentes problématiques liées à l'éthique et la conformité sont toutes reliées au développement durable. L'éthique et la gouvernance font partie des compétences transversales du développement durable (BNQ, 2011) (Figure 1.4). En effet, la morale fait désormais partie de la gouvernance d'entreprise et d'activités. À la suite de nombreux scandales économiques et la sensibilisation du public, les principes du développement durable ont été institutionnalisés par plusieurs (Dionne-Proulx & Larochelle, 2010; Mathieu & Soparnot, 2009). La majorité des objectifs de développement durable des nations unies soient affectés par une gestion intègre dans le domaine de la construction et du génie-conseil, certains se démarquent. En effet, le huitième objectif sur le travail décent pour tous ainsi que le seizième pour des institutions efficaces sont les principales sphères couvertes (Nations Unies, 2019). Avec la popularité grandissante du développement durable, la responsabilité sociale des entreprises englobe de plus en plus d'aspects. Les entreprises doivent désormais faire preuve de diligence raisonnable et contrôler les impacts indirects de leurs opérations. Aussi, il est important de différencier les risques internes et externes. En effet, à l'interne les risques proviennent principalement d'employés malveillants, de mauvais procédés ou du manque de culture éthique et peuvent faire l'objet d'une recherche complète à eux seuls (Schaefer, 2017). Dans le cadre de ce mémoire, les risques provenant des partenaires d'affaires, donc de l'externe, seront traités. Les droits humains et sociaux, les conflits d'intérêts, la collusion et la corruption, l'évasion fiscale, la gestion des données confidentielles et la responsabilité environnementale seront abordés dans les sections subséquentes.

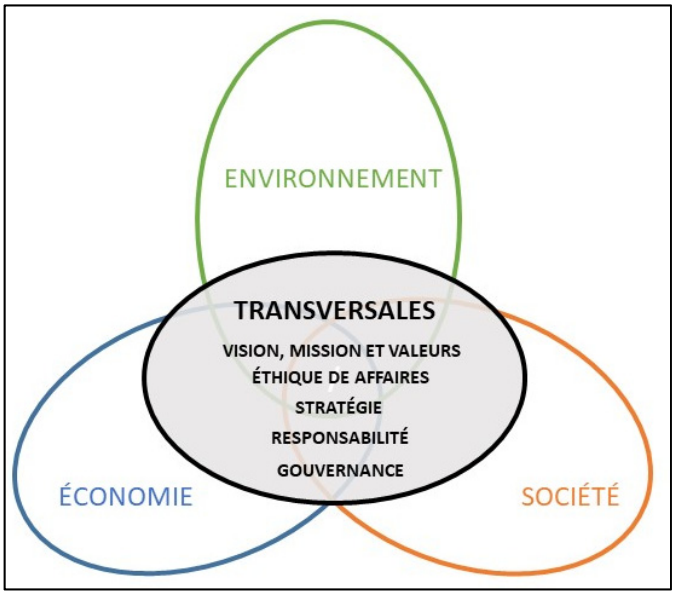

Figure 1.4 Compétences transversales du développement durable selon la norme BNQ 21 000

1.2.2.1 Droits humains et sociaux

Les droits humains sont depuis longtemps au cœur des préoccupations de différentes organisations non gouvernementales et sans but lucratif. Les actions visent principalement la lutte contre l'esclavage moderne et le travail des enfants ainsi que les conditions générales de travail. Le domaine de la construction et du génie-conseil est particulièrement exposé à ce genre de problématique en raison des chaînes d'approvisionnement et de services complexes (CIOB, 2016) (voir appendice A pour plus d'informations à ce sujet). En effet, les entreprises doivent continuellement gérer de nouveaux fournisseurs en raison du caractère cyclique des projets (Behera, Mohanty, & Prakash, 2015). Elles ont très peu de vision sur plusieurs aspects de leurs activités comme l'extraction de matériaux primaires ou les projets outre-mer qui emploient fréquemment des travailleurs migrants qui se retrouvent parfois pris au piège par des agences de location de main-d'œuvre. Ce problème est particulièrement présent dans la péninsule arabique ou de nombreux cas ont été recensés récemment (Chaudhary, 2017; Human Rights Watch, 2019; Millward, 2017)

L'esclavage moderne est un enjeu du 21e siècle. En effet, souvent caché et camouflé, des entreprises internationales y participent. Parfois en connaissance de cause, elles collaborent avec des acteurs liés à des réseaux de prostitutions, du crime organisé et autres (McCorquodale, Smit, Neely, & Brooks, 2017). L'esclavage moderne est présent sur tous les continents, particulièrement en Asie (Institute of development studies, 2018). Selon l'organisation Anti-slavery international environ 40.3 millions de personnes sont esclaves modernes. Parmi ceux-ci, 10 millions d'enfants, 24.9 millions au travail forcé, 15.4 millions au mariage forcé et 4.8 millions victimes d'exploitations sexuelles (Anti-slavery international, 2018). De ces chiffres, 30.4 millions proviennent d'Asie et 9.1 d'Afrique. Les profits illégaux associés à l'esclavage moderne sont estimés à 150 milliards de dollars américains annuellement. Des centaines de milliers d'esclaves sont également présents en Amérique du Nord (500 000) et en Europe (1.25 million).

Pour reconnaître l'esclavage moderne, il faut déterminer si la personne est forcée de travailler, sous l'emprise et le contrôle d'un employeur, déshumanisée et traitée comme une propriété ou contrainte physiquement. Les formes d'esclavages modernes sont le travail forcé (sous la menace d'une conséquence), le travail pour dette (emprunt et remboursement au travers du travail), trafic humain, esclaves à cause de leur généalogie, l'esclavage des enfants et le mariage forcé (Scarpa, 2008).

Les conditions de travail sont un sujet important de l'éthique à l'interne et à l'externe de la compagnie. À l'interne, le traitement que l'entreprise réserve à ses employés est intimement lié à la performance et la loyauté de ceux-ci (Bodet, 2007). Plusieurs organisations font la promotion et légifèrent ce domaine. Les syndicats et regroupements de travailleurs militent principalement pour les conditions de travail offertes aux employés, alors que la commission des normes, de l'équité, de la santé et sécurité au travail (CNESST) milite pour la santé et la sécurité de ceux-ci (CNESST, 2018). Cette organisation est particulièrement sensible à la réalité du secteur de la construction. En effet, 18 travailleurs se blessent quotidiennement sur les chantiers et les inspecteurs appliquent une tolérance zéro pour les dangers liés aux chutes, aux lignes électriques, aux

effondrements et à l'exposition à la silice et l'amiante (CNESST, 2016). Ailleurs dans le monde, de nombreux cas ont fait les nouvelles à cause des conditions de travail dangereuses ou insalubres imposées par des employeurs internationaux. À cause du manque de loi dans les pays en développement, la principale conséquence pour la négligence des employés dans les compagnies internationales est liée à la réputation. Un évènement marquant est survenu en 2013 au Bangladesh, lorsqu'un immeuble de neuf étages, la Rana Plaza, s'est effondré tuant près de 1200 employés (Syed, 2018). À ce jour, la compagnie fautive (Loblaw) est encore en cour et fait face à une poursuite de 2 milliards de dollars.

1.2.2.2 Conflits d'intérêts

Les conflits d'intérêts peuvent parfois être difficilement identifiables par les personnes directement impliquées. En effet, ces personnes, bien que conscientes du conflit, n'évaluent pas adéquatement à quel point il a une influence sur leurs prises de décision (Davis, 2015). Un conflit d'intérêts peut être qualifié de potentiel, apparent ou réel. Il survient lorsqu'une entité a un intérêt personnel qui pourrait influencer sa décision et défavoriser les personnes dépendantes de cette décision. Plus que jamais, les employés changent d'employeurs fréquemment passant parfois du privé au public et vice versa. Ceci entraîne souvent de possibles conflits d'intérêts, particulièrement pour les gestionnaires (OECD, 2003b). Ces conflits peuvent également survenir au sein d'une même compagnie. En effet, une entreprise participant aux projets de deux mégas-hôpitaux québécois a dû prendre des mesures exceptionnelles comme la relocalisation de certains employés et l'implantation de procédures empêchant la communication entre certaines unités d'affaires car elle avait un rôle de consultant pour le public dans un des cas et le rôle d'entrepreneur privé dans le second (Coalition CHUs sans PPP, 2014).

1.2.2.3 Collusion et corruption

La lutte à la collusion est indispensable à un environnement concurrentiel juste pour tous. La collusion est définie comme une entente entre soumissionnaires afin d'éliminer l'élément concurrentiel du processus effectué à l'insu de l'émetteur d'appel d'offres de façon volontaire ou forcée (intimidation) (Conseil du trésor, 2011).

Les impacts des ententes collusoires sont liés à une mauvaise concurrence (Banque Mondiale, 2018). En effet, quatre méthodes sont utilisées afin de créer une apparence de concurrence soit la remise de soumissions fictives, la rotation des gagnants, la répartition des contrats ainsi que la suppression des soumissions (Conseil du trésor, 2011). La concurrence est la solution principale pour protéger l'intégrité des contrats publics et du système d'appel d'offres. Plusieurs points négatifs ressortent de ces pratiques. Ils affectent principalement les contribuables ainsi que les entreprises honnêtes (Locatelli, Mariani, Sainati, & Greco, 2017). Le premier impact majeur est lié au coût et à la qualité des travaux. En effet, les ententes collusoires entraînent nécessairement une hausse générale des coûts des travaux. La fausse apparence du prix le plus bas fait profiter un groupe très restreint d'individu au détriment de la société. Le second impact majeur est lié aux autres entreprises honnêtes. En effet, la présence de collusion peut réduire le nombre d'entreprises susceptibles de gagner la soumission et par le fait même la qualité de la concurrence. Peu de nouvelles entreprises arriveront sur le marché en raison de l'absence de contrat pour les dirigeants souhaitant suivre le droit chemin.

La corruption, quant à elle, est souvent liée à un second problème qui est la présence du crime organisé dans le domaine de la construction au Québec. Ces organisations criminelles se servent de la construction afin de procéder au blanchiment d'argent considérant les sommes importantes d'argent entrant et sortant lors de la réalisation de travaux (Gambetta & Reuter, 2000). Afin d'arriver à leurs fins, elles offrent des avantages illicites à des personnes occupant des postes dans la fonction publique ou privée. La corruption affecte également les plus démunis qui subissent les effets des coûts élevés ou

du manque d'infrastructure (Hess, 2018). La culture de la corruption est particulièrement présente ailleurs dans le monde ou les pots-de-vin ou paiements de facilitation sont demandés en public par des autorités pour des gestes du quotidien, parfois même vitaux, comme accéder à de l'eau potable (PACI, 2013).

1.2.2.4 Évasion fiscale

L'évasion fiscale survient lorsqu'une entité ignore volontairement les lois fiscales. Falsification de documents et demandes, omission délibérée de déclarer certains revenus ou gonflement des dépenses sont tous des gestes qualifiés d'évasion fiscale. Il existe plusieurs formes d'évasion fiscale telles les possessions à l'étranger, la contestation de l'impôt ou les promoteurs de stratagèmes fiscaux. Un des plus grands scandales liés à l'évasion fiscale est sans contredit les Panama Papers (Harding, 2016). À la suite d'une fuite d'information obtenue par des journalistes, l'enquête a révélé l'implication de 12 hauts dirigeants (dont des présidents encore actifs) dans des activités d'évasion fiscale. La plus grande firme de génie-conseil d'Amérique latine, Odebrecht, a été poursuivie pour corruption, pots-de-vin et blanchiment d'argent suite au scandale.

1.2.2.5 Gestion des données confidentielles

Les bases de données ne cessent de grossir depuis plusieurs années permettant la création de nouvelles connaissances, de meilleures prédictions et services, une meilleure planification urbaine, etc. La quatrième révolution industrielle sera pilotée par l'analyse de grands ensembles de données par l'intelligence artificielle, l'internet des objets et les chaînes de blocs (Gubbi, Buyya, Marusic, & Palaniswami, 2013). Toutefois, ceci n'est pas sans conséquence. Plusieurs critiquent cette industrie, car ils y voient une intrusion dans la vie privée et croient que les données peuvent être utilisées à des fins discriminatoires entre de mauvaises mains (Craig & Gregory, 2018). Souvent, leurs avantages viennent avec des inconvénients. Par exemple, pour la planification urbaine, les bases de données

peuvent être utilisées pour la gestion du trafic ou l'identification de zones à améliorer tout en étant utilisées pour déterminer la localisation en tout temps des citoyens (Martin, 2015).

1.2.2.6 Responsabilité environnementale

La responsabilité environnementale et les droits environnementaux sont des sujets d'actualité. En effet, peu de sanctions sont en place à ce jour et se limitent à des amendes pour les entreprises fautives. Ces amendes représentent souvent des coûts moindres que d'établir la conformité environnementale pour les grandes entreprises. Les modèles récents prévoient des sanctions administratives, au code civil et pénal (Garcia & Fonseca, 2018). Les mesures sont souvent en réaction à la dénonciation et au travail effectué par des organismes non gouvernementaux (White, 2013). La criminologie verte est un sujet qui se développe peu à peu, mais les plus grandes sanctions demeurent lorsque les humains sont affectés directement par la négligence environnementale des compagnies. Récemment, la compagnie Monsanto et leur produit *Round-Up* ont fait les manchettes relativement à un cas de cancer lié à l'utilisation de cet herbicide (Elias, 2018). Les crimes affectant la biodiversité et les écosystèmes ne sont pas toujours sévèrement punis. La plus grande motivation des compagnies pour la conformité environnementale se trouve principalement dans leur réputation à conserver ou à bâtir. Au Québec, le Centre Québécois du Droit de l'Environnement (CQDE) est un organisme sans but lucratif qui fait pression et réforme les lois au niveau fédéral et provincial. La cimenterie Port-Daniel, le pipeline Énergie-est, les gaz de schiste, le pétrole d'Anticosti, la réforme de la loi sur la qualité de l'environnement du Québec et la loi sur les milieux humides sont quelques dossiers dans lesquels le CQDE a joué un rôle important (CQDE, 2018).

1.2.3 Les organisations et ouvrages de référence en éthique et conformité

Plusieurs documents de référence sont publiés périodiquement par des organisations mondialement reconnues. Ces ouvrages font office de standards dans de nombreuses entreprises avec une philosophie durable pour la gestion des risques liés à l'intégrité.

clicours.com

Tableau 1.4 Ouvrages de référence en intégrité

Organisation	Vocation	Siège social	Document
Dow Jones	Fournisseur de service, journalistique	États-Unis	Third party risk management trends
Navex	Fournisseur de service	États-Unis	Third party risk management benchmark report
Banque Mondiale	Service public	États-Unis	Divers
Transparency International	Anticorruption	Allemagne	Corruption perception index
Ethisphere	Fournisseur de service	États-Unis	Certification
TRACE	Anticorruption	États-Unis	Bribery risk matrix
Walk Free Foundation	Esclavage moderne	Australie	Global Slavery Index
CATO	Droits humains	États-Unis	Human Freedom Index
International Organization for Standardization	Conformité et normalisation	Suisse	ISO 26000, 37001 et 19600
Royaume-Uni	Service public	Royaume-Uni	UK Bribery Act
États-Unis	Service public	États-Unis	Foreign Corrupt Practices Act
Human Rights Watch	Droits humains	États-Unis	Rapport annuel
Nations Unies	Service public	États-Unis	Déclaration universelle des droits de l'Homme
Tax Justice Network	Fiscalité	Royaume-Uni	Financial Secrecy Index
Sunlight Foundation	Accès à l'information	États-Unis	Rapport divers

1.2.3.1 Third party risk management trends – Dow Jones

Ce rapport couvre les récentes avancées en matière de gestion des partenaires d'affaires. Les différents facteurs de risques identifiés dans ce rapport sont la taille de l'opportunité, la proximité avec des agents publics, le risque propre au pays, le type de relation ainsi que le type d'industrie. Un sondage révèle que 83% des répondants effectuent une recherche par rapport à l'origine du pays de leurs partenaires potentiels via différentes bases de données. Les principaux éléments vérifiés par les compagnies sont les propriétaires de la compagnie et la haute direction, l'état financier et sa performance ainsi que la réputation et les nouvelles dans les médias associées au partenaire (Dow Jones, 2018).

1.2.3.2 NAVEX Ethics & Compliance Third-party risk management benchmark report

Ce rapport couvre également la gestion des partenaires d'affaires. Les principaux risques soulignés sont l'environnement et l'industrie dans lesquels l'entreprise évolue, la localisation de la tierce partie, les interactions avec le gouvernement, le type de relation, la grosseur de l'engagement (financièrement) et l'historique de la tierce partie. Un sondage effectué dans ce même rapport indique que les principales difficultés sont liées au suivi à long terme des tierces parties, la formation de ces dernières ainsi que leur nombre. Selon un second sondage, le nombre d'incidents éthique a considérablement réduit à la suite de la mise en place d'un programme de gestion des risques (NAVEX Gobal, 2018).

1.2.3.3 Banque Mondiale

La banque mondiale est un important donneur d'ouvrage à l'international. En plus de travailler dans les pays en voie de développement, la banque participe grandement à l'élaboration de normes et standards pour une saine gouvernance de ses projets et des compagnies qui y participent. Parmi les mesures abordées par la banque mondiale pour la conformité des entreprises il y a le code de conduite, les responsabilités, le programme de contrôle des risques, les politiques internes, les partenariats, les contrôles internes, les formations, les incitatifs, les rapports, les mesures correctives ainsi que les actions collectives de l'entreprise. Plusieurs entreprises s'autoévaluent à partir de ces mesures. Elles permettent également à la Banque Mondiale de choisir les acteurs qui participeront à leurs projets (Bank, 2016; Banque Mondiale, 2018).

1.2.3.4 Transparency International Corruption Perception Index

Le rapport annuel du Transparency International Corruption Perception Index (TICPI) est à la base de nombreuses évaluations des risques à l'échelle planétaire. En effet, plusieurs guides abordent ces données renouvelées annuellement. Chaque pays est évalué selon le

Clicours.COM

nombre de cas de corruption, l'efficacité du système judiciaire, l'accès à l'information et la protection des lanceurs d'alerte. Les entreprises possèdent souvent des barèmes en dessous desquels une évaluation plus sévère du risque est recommandée. La liberté de regroupement ou d'association, de presse, d'expression et la participation civile sont les quatre facteurs sur lesquels se base la Global Coalition Against Corruption afin de produire le rapport (Global coalition against corruption, 2018). Ce rapport fait indéniablement partie du risque que présente un pays.

1.2.3.5 Ethisphere

Ethisphere fournit des services aux entreprises souhaitant améliorer leur éthique corporative grâce à des formations. En plus de publier un périodique sur l'éthique, l'organisation fait également un classement des compagnies les plus éthiques depuis 2007 et offre des prix et autres distinctions pour les efforts que mettent les organisations dans la promotion de l'éthique. Ces distinctions sont reconnues mondialement (Ethisphere, 2018).

1.2.3.6 TRACE – Bribery risk matrix

TRACE offre également des données par pays concernant la corruption et les pots-de-vin. La matrice de TRACE note chaque pays selon quatre évaluations. La première traite des interactions avec des agents publics en mesurant leurs fréquences et la possibilité qu'un pot-de-vin soit demandé. La seconde mesure l'attitude de la société face à la corruption et les mesures législatives en place pour contrer la corruption. La troisième porte sur la transparence du gouvernement et des banques. La quatrième aborde les acteurs externes et leur liberté (population, médias, etc.) (TRACE, 2018b).

1.2.3.7 Global Slavery Index (GSI)

Cette organisation offre des données concernant l'esclavage moderne par pays. La note est basée sur trois évaluations. La première évaluation traite de la vulnérabilité du pays à l'esclavage selon les problématiques du pays (accès aux besoins élémentaires, inégalités, conflits et droits des minorités). La seconde aborde la prévalence à l'aide de sondages distribués dans plusieurs pays demandant si le répondant avait eu connaissance ou subis des actes s'apparentant à de l'esclavage moderne. La troisième évalue la réponse du gouvernement pour combattre l'esclavage moderne (support des victimes, prévention et efficacité du système judiciaire et responsabilisation des agents publics et entreprises) (Global Slavery Index, 2018).

1.2.3.8 Human Freedom Index (CATO)

Ce classement note les différents pays selon leur liberté personnelle et économique. La liberté personnelle prend en compte le système judiciaire et la sécurité des habitants (homicides, terrorisme, femmes, etc.). Elle inclut également la liberté de mouvement, de religion, d'association, d'expression et d'identité. La liberté économique aborde le gouvernement, l'accès à la propriété, les lois et la transparence des banques, les lois pour les entreprises privées et les lois sur le travail (Porcnik, 2018).

1.2.3.9 International Organization for Standardization (ISO)

ISO est une organisation réputée depuis de nombreuses années. Leurs barèmes, normes et standards sont utilisés mondialement et plusieurs donneurs d'ouvrages obligent les compagnies soumissionnaires à être certifiée ISO. Parmi les normes intéressantes à l'éthique et la conformité, il y a la ISO 26 000 Responsabilité sociale (International Organization for Standardization, 2010) qui englobe les grands principes du développement durable, la ISO 37 001 Gestion des systèmes anticorruption (International Organization for Standardization, 2016) ainsi que la ISO 19 600 Gestion de la conformité

(International Organization for Standardization, 2014) qui permet aux entreprises d'être conformes à diverses lois et divers traités dont la UK Bribery Act et la Foreign Corrupt Practice Act (FCPA) qui seront abordées subséquemment.

1.2.3.10 UK Bribery act

Le UK Bribery act est en application depuis 2010. Selon plusieurs, c'est la mesure la plus sévère de lutte à la corruption actuellement. En effet, la loi stipule que toutes les compagnies ayant un lien avec le Royaume-Uni sont sujettes à cette loi. La loi couvre également tous les crimes commis à l'étranger, à l'extérieur du territoire du Royaume. Les pénalités peuvent aller jusqu'à dix ans d'emprisonnement, la prise des propriétés et il n'y a aucune limite pour l'amende imposée (United Kingdom, 2010). Une compagnie de gestion de la construction (Swett group) a payé plus de deux millions en pénalité après avoir été reconnue coupable de ne pas avoir suffisamment prévenu la corruption en 2016, une première pour cette loi dans l'industrie.

1.2.3.11 Foreign Corrupt Practices Act (FCPA)

Le but de cette loi est d'éviter qu'une compagnie influence un agent public par le versement d'un pot-de-vin ou autres. Cette loi est applicable pour toutes les entreprises faisant affaire aux États-Unis ou utilisant les devises américaines. Tout individu impliqué dans ce genre d'activité peut se voir imposer une peine de prison (United States of America, 1977).

1.2.3.12 Human rights watch (HRW)

L'organisation HRW produit un rapport annuel par pays concernant l'état des droits humains. Le rapport est basé sur le droit des femmes et des enfants, les détentions arbitraires, la liberté d'expression et d'association et des facteurs propres au pays ou à la région géographique (Human Rights Watch, 2018). Grâce à ceci, des organisations font

des classements et notent/évaluent les pays. Certains sites répertorient les évènements liés aux droits humains par entreprise facilitant ainsi l'évaluation du risque que présente un partenaire d'affaires (Business & Human Rights Resource Centre, 2018).

1.2.3.13 Déclaration universelle des droits de l'homme

La déclaration a été adoptée à Paris en 1948 par les 58 membres qui constituaient l'assemblée des Nations unies. Elle fait encore office de référence aujourd'hui et est utilisée par les différents législateurs et entreprises afin d'encadrer leurs activités. Le premier article de la déclaration englobe les 29 autres et mentionne que tous les êtres humains naissent libres et égaux en dignité et en droit et qu'ils sont doués de raison et de conscience et doivent agir les uns envers les autres dans un esprit de fraternité (United Nations, 1948).

1.2.3.14 Financial secrecy index

Ce classement regroupe les pays et juridictions selon leur niveau de secret bancaire. Cet index permet d'évaluer les risques liés à l'évasion fiscale, le blanchiment d'argent et autres formes d'évitement illégal d'impôt effectué par certaines entreprises. Le classement est basé sur vingt indicateurs tels l'accès aux informations concernant les propriétaires des entreprises, la divulgation de l'impôt des entreprises, les lois anti-blanchiment d'argent et autres (Tax Justice Network, 2018).

1.2.3.15 Sunlight foundation

Cette fondation indépendante a pour but la responsabilisation et la transparence des politiques et gouvernements. Grâce à la technologie, elle souhaite permettre aux citoyens de suivre en temps réel les développements et d'encourager la démocratie en facilitant la participation citoyenne. Elle tire son nom du concept des sunshine laws Américaines, des lois voulant faire la lumière sur différentes décisions douteuses des décideurs publics et

privés (Du, Yu, & Yang, 2019). Ces actions touchent, notamment, les conflits d'intérêts des politiciens, les changements législatifs en ce qui concerne l'accès à l'information et la création de formations pour les citoyens (Sunlight Foundation, 2019).

1.3 Les partenaires d'affaires

Plusieurs types de partenariats sont possibles dans le domaine de la construction. Ils ont tous des avantages et des difficultés qui leur sont propres. Parfois obligatoires, ces partenariats peuvent être la source de nombreux risques et conflits dans la gestion d'un contrat. Les compagnies ont des procédures selon le partenariat et le type de projet. Dans certains cas, ces partenariats peuvent s'échelonner sur plusieurs décennies. Un examen approprié est nécessaire afin d'évaluer les conséquences à long terme d'une telle décision.

Des études ont démontré que dans 75% des cas de pots-de-vin, une tierce partie était impliquée entre 1999 et 2014 (OECD, 2014a). Aussi, avec la mondialisation, les compagnies internationales sont grandement dépendantes de la sous-traitance et lèguent jusqu'à 90% de la valeur du contrat à des partenaires d'affaires dans le domaine de la construction et du génie-conseil (Watson & Serra, 2016). Dans ce contexte, les partenaires d'affaires représentent un risque important pour les entreprises. Les différents types de partenariat seront expliqués et des facteurs de succès seront présentés (Figure 1.5).

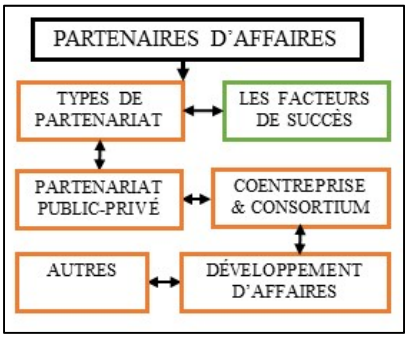

Figure 1.5 Schéma des sous-sections sur les partenaires d'affaires

1.3.1 Types de partenariat

La gestion des contrats de construction comprend souvent la gestion de ces partenaires. Selon leur mandat, ils ont tous des risques qui leur sont propres et représentent tous la compagnie auprès de tierces parties.

1.3.1.1 Partenariat public-privé

Les partenariats public-privé sont souvent prisés par les gouvernements. Ils sont présentés comme étant à moindre cout et à plus faible risque (Bloomfield, 2006). Le choix d'un tel type de partenariat à de grandes conséquences sur l'entreprise et la société en général, et ce, pour plusieurs générations. Plusieurs critiquent ce type d'association, car il difficile, voire impossible d'arriver à un réel partenariat entre le public et le privé ou chacun laisse ses intérêts au profit du partenariat. En effet, vu les objectifs différents de ces deux entités (profit versus services à la population), le consensus est parfois difficile. Également, plusieurs disent que la compétition est réduite dans de tels contrats, car seules les grosses entreprises ont les moyens de financer ces projets. De plus, les lois et règlements doivent souvent être modifiés pour permettre la réalisation du contrat (Bloomfield, 2006; Hodge & Greve, 2017). À première vue, ceci démontrerait le désir d'innovation du gouvernement, son efficacité et sa confiance envers son partenaire privé. En réalité, plusieurs voient en cette procédure une forme de collusion nuisant à la saine compétition dans l'économie de libre marché actuelle. Malgré tous ces points négatifs, les partenariats public-privé permettent la réalisation de projets d'infrastructure majeurs. Les gouvernements font appel au privé, car ce genre de processus permet de construire sans s'endetter. En effet, les paiements au privé sont comptabilisés comme des frais d'exploitation et non un emprunt (Bloomfield, 2006). Ceci permet à l'état de préserver la qualité de son statut d'emprunteur à l'international.

Afin d'évaluer les possibles partenaires, plusieurs critères sont étudiés. Les facteurs de succès sont liés aux caractéristiques du projet, aux arrangements contractuels, aux

participants et au procédé (Zhang, 2005). Les échecs passés sont liés aux attentes divergentes des partenaires, aux directives floues, au manque d'engagement, à la complexité du processus décisionnel, aux normes et aux lois restrictives, à la mauvaise gestion du risque et au manque de compétition. Ce type de partenariat est très populaire dans le domaine de la santé et des infrastructures (Roehrich, Lewis, & George, 2014).

1.3.1.2 Coentreprise/consortium

La coentreprise est la mise en commun des ressources de deux compagnies distinctes pour la réalisation d'activités économiques communes alors que le consortium est pour la réalisation d'un objectif commun. Plusieurs coentreprises/consortium ont pris place au Québec dans les dernières années (pont Champlain/signature sur le Saint-Laurent, REM/NouvelR, etc.). Ces associations sont parfois difficiles parce que les partenaires agissent également à titre de compétiteurs. Leur partenariat doit être basé sur trois types de lien (Ozorhon, Arditi, Dikmen, & Birgonul, 2008). Au niveau stratégique, les entreprises doivent avoir des buts communs, de l'expérience dans des projets semblables et des régions semblables. Au niveau organisationnel, elles doivent avoir une compatibilité/complémentarité financière, du système de gestion et de la taille de la compagnie. Finalement, au niveau culturel à l'international, elles doivent prendre en compte la distance du pouvoir (degré d'inégalité sociale dans le pays), l'importance de la collectivité versus individualité, degré de risque ou d'incertitude acceptable et l'orientation de la société à long terme.

Les différentes crises économiques et l'augmentation de la compétition forcent les compagnies à s'associer pour réaliser différents projets. Ceci réduit certains risques, mais en entraîne de nouveaux. Les principaux risques liés aux coentreprises/consortiums internationaux sont le flux monétaire du partenaire, les fluctuations légales et économiques (sanctions), le manque de communication, le manque de confiance et l'incompatibilité (Bing & Tiong, 1999).

1.3.1.3 Développement d'affaires

Le développement d'affaires est un domaine très large dans la construction et comprend de nombreux acteurs. Que ce soit pour effectuer la prospection de nouveaux clients, agir à titre d'agent de vente, effectuer de la commercialisation (marketing) ou agir à titre de lobbyiste, le domaine de la construction fait appel à ce genre de spécialiste. Le développement des affaires est intimement lié à la stratégie de l'organisation et fait partie du modèle d'entreprise (Smyth, Fellows, Liu, & Tijhuis, 2016).

Ces différents rôles peuvent représenter un enjeu critique pour les entreprises en construction. En effet, ils représentent tous les entreprises auprès de tierces parties. L'entreprise peut donc être punie pour une faute effectuée par l'un de ses intermédiaires. Un agent de vente est indépendant et est chargé de négocier et conclure des contrats au nom de l'entreprise (Gadde & Dubois, 2010). La commercialisation est la mise sur le marché d'un nouveau produit ou service. Le lobbyiste effectue des communications d'influence à un titulaire de charge public et est régi par une loi et un code de déontologie au Québec (Conseil du trésor, 2011).

1.3.1.4 Autres

Plusieurs autres types de partenariat existent. Parmi ceux-ci il y a notamment, les services d'experts-conseils (avocats, consultants, architectes, etc.), les agents de licences de visa ou douaniers, les parrains locaux obligatoires ou les entreprises de recrutement.

Les parrains locaux sont chose fréquente dans plusieurs régions du monde. En particulier, ils sont très présents au Moyen-Orient dans les projets d'exploitation pétrolière (El-Sabek & McCabe, 2018). Les gouvernements obligent les entreprises étrangères à faire affaire avec ces intermédiaires (M. Loosemore & Muslmani, 1999). Tous ces autres types de partenariat ont également des risques qui leur sont propres, car ils représentent tous la société auprès de tierces parties.

clicours.com

1.3.2 Facteurs de succès et d'échec des partenariats

Le succès ou l'échec d'un partenariat dépend de plusieurs éléments. Les facteurs de succès sont liés au type de procédé, de projet et de contrat ou à l'attitude générale des partenaires (Ola-Awo, Wasiu, & Bin Amirudin, 2016; Wøien, Hosseini, Klakegg, Lædre, & Lohne, 2016). Les facteurs de succès liés au type de projet ou de contrat ainsi qu'à l'attitude des partenaires sont présentés ici-bas et au tableau 1.4 :

- implication de l'entrepreneur dès le début de la conception;
- posséder des objectifs mutuels;
- avoir un contrat conception-construction;
- inclure des consultants spécialistes dans le partenariat (architectes, ingénieurs);
- effectuer une formation de départ pour la gestion du partenariat.

Tableau1.5 Facteurs de succès des partenariats liés à l'attitude

Élément	Description
Objectifs mutuels	Les objectifs doivent inclure les critères de succès propres à chaque partenaire
Efficacité décisionnelle du client	Les décisions devraient être effectuées par le responsable hiérarchique le plus bas apte à les prendre
Ateliers	Inclure des activités pour favoriser l'esprit d'équipe
Confiance	Partage mutuel de toutes les informations et ouverture d'esprit
Engagement	Toutes les parties démontrent leur engagement l'une envers l'autre
Compétence	Les acteurs doivent être compétents dans des situations de partenariat et dans le domaine de la construction en général
Communications	Centraliser les communications et résoudre les conflits dès qu'ils surviennent

Parmi les autres facteurs de succès liés à l'attitude des partenaires, il y a également les relations de compétitions passées entre les deux partenaires, l'absence de compromis et le mauvais partage d'informations (Ola-Awo et al., 2016).

1.4 Conclusion de la revue de la littérature

L'exploration de la gestion des risques, l'intégrité et les partenaires d'affaires permet de mieux comprendre la réalité des entreprises souhaitant améliorer leur processus de conformité éthique des partenaires d'affaires. Les articles qui suivent reposent tous sur les fondements et la littérature abordée dans cette section. La suite illustre comment un chercheur peut se servir de ces différentes connaissances afin de proposer un outil de gestion des partenaires d'affaires adapté à la réalité de la construction et du génie-conseil.

Clicours.COM

CHAPITRE 2

THIRD PARTY INTEGRITY MANAGEMENT IN CONSTRUCTION ENGINEERING INDUSTRY

Vincent Roy[a], Dominique Desjardins[b], Camille Fertel[c], Claudiane Ouellet-Plamondon[a]

[a]Département de Génie de la construction, École de Technologie Supérieure,
1100 Notre-Dame Ouest, Montréal, Québec, Canada H3C 1K3
[b] Département intégrité , SNC-Lavalin,
455 René-Lévesque Ouest, Montréal, Québec, Canada H2Z 1Z3
[c] Economist consultant, Montréal, Québec, Canada

Article soumis pour publication au Journal of Construction Engineering and Management, juin 2019

Abstract :

This paper aims to investigate the integrity-related risks associated with third parties in the construction engineering industry. This case study methodology evaluates the business partner compliance process in a multinational company. A tool to upgrade is used to facilitate this process by assessing the risk involved in order to determine the level of due diligence necessary for each partner. This study finds that companies must conduct surveys and internal investigations to improve their integrity tools. Collecting expert opinions on risk is necessary to allow an improved understanding of what the scope of the tool should be. This study suggests new ways for improving the integrity tool and demonstrates the necessity to include new questions covering risks associated with human rights, conflict of interest, antitrust and competition, as well as compliance with regulations, must be addressed in the compliance tool to evaluate business partners.

Keywords: Integrity, Construction engineering, Third party, Risk management, SWOT analysis

2.1 Introduction

The need for corporate social responsibility (CSR) in engineering and construction has never been higher. In addition to its direct positive impacts for a company, CSR is now required by many public and private organizations (Dainty, 2009). Construction engineering is considered as the most corrupt sector in wealthy countries (Transparency International, 2011). New risks associated with integrity, business ethics and compliance are emerging, and companies need to manage them. These risks are both internal and external, and are often related to interactions between suppliers, business partners, and other third parties. Of specific concern to the engineering and construction industry are the very high number of daily interactions associated with the activities of these stakeholders. According to the Organization for Economic Cooperation and Development (OECD), three out of four foreign bribery cases involve payments through intermediaries (OECD, 2014a). In this context, third-party risk management theories and guidelines have emerged (Dow Jones, 2018; NAVEX Gobal, 2018; PACI, 2013; Shen, Li, Lin, & Liang, 2018) suggesting due diligence measures as a necessary step, not only for financial purposes, but also for preserving integrity.

Interestingly, past studies about construction risk management did not integrate integrity-related risks (Deng, Low, Li, & Zhao, 2014; Tang, Qiang, Duffield, Young, & Lu, 2007). For companies, integrity is closely related to their code of conduct, and includes risks associated with elements such as corruption, human rights, conflict of interest, compliance with regulations, and so on. Recent research suggests including these risks (Mhetre, 2016; Sadgrove, 2015) and proceeding with an overall review of the entire company governance structure in order to cover all integrity-related risks.

There is presently a demand for prescriptive models dealing with ethical issues among construction-related organizations (Ho, 2011). If the company faces allegations of misconduct due to the actions of a third party it has engaged, demonstrating sufficient due diligence will significantly reduce any potential penalties it may face (United States Sentencing Commission, 2018). Moreover, many international funding institutions, such as the World Bank, have strict

requirements regarding due diligence measures, and risk assessment has become a contractual requirement.

Enterprise performance management enables continuous improvement with the help of performance analysis tools (Cokins, 2013). Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis has been used in studies examining strategic management in construction and engineering companies to evaluate the management effectiveness (Zavadskas, Turskis, & Tamosaitiene, 2011), to manage water resources (Rao, Chhabria, Gunasekaran, & Mandal, 2018), and more (Bull et al., 2016; Jaber, Elkarmi, Alasis, & Kostas, 2015; Njoh, 2017). The present study similarly uses SWOT, primarily in an attempt to improve the management of integrity-related risks by identifying gaps according to survey results.

To create a risk management program, one must collect data about risk perception among experts. The lack of available data in the scientific literature and the dearth of prior studies on this subject make it necessary to start from a case study and then develop a theory based on the findings. As part of the present research, a case study of a company operating in the engineering and construction industry is analyzed. This company was chosen because of its size and international renown. Following past misconduct, the company became a leader in developing an ethical and integrity culture (Hachey, 2012; World Bank, 2013), in addition to also being an innovation-driven organization systematically engaging in risk assessment. The aspired theoretical contribution of this research is to identify which indicators could reveal risks related to integrity and how organizations could include experts' opinion to have a more comprehensive risk management process for third parties in the construction engineering industry.

2.2 Literature review

To attain the objectives of this research, it is necessary to cover different subjects in the literature to have a comprehensive understanding of the context. Firstly, the concept of integrity, its management and the unicity of the construction engineering sector is discussed.

Secondly, the different types of business partners are presented. Thirdly, engineering risk management are shortly addressed. Fourthly, integrity-related risks and their indicators according to various references are covered. Finally, enterprise performance management and the use of SWOT is explained.

2.2.1 Integrity

Integrity has many definitions. A research presenting the results of interviews with seven chief executives of large firms suggest that integrity is the wholeness and coherence with core values such as honesty and justice (Badaracco & Ellsworth, 1991). Others from the business ethics area argue that integrity is being consistent with laws and regulations, and demonstrating exemplary moral behavior in accordance with norms and values (Brenkert, 2004). While defining integrity is not the core subject of this article, it is important to understand that the concept of integrity is not universal. Notwithstanding this, all consider that integrity engender commitment and trust, and ensure the welfare of all stakeholders (Lawton & Páez, 2015).

Implementing corporate ethical culture is challenging. Codes of ethics are an effective way to shape integrity management, but they must be embraced by the leaders and proper communication is a crucial success factor (Stevens, 2008). Values and ideals must be discussed between the employees and management. Based on insights from strategic planning, an author identified three barriers/enablers for effective governance of corporate ethics (Bonn & Fisher, 2005). Companies should foster a flexible approach by including discussion and debates among all employees. They must also monitor the implementation of ethical culture with indicators, not solely financial. Finally, companies should integrate ethics throughout the organization with trainings, communication channels and enthusiasm from top to bottom.

Construction engineering is considered to be the most corrupt sector (Transparency International, 2011). What make integrity management in construction engineering industry so special? Firstly, construction represents an important part of the country’s GDP and is a key driver for economic growth (Ho, 2011). Secondly, construction requires many interactions

with governments and state employees (public projects, licenses, permits, etc.). Thirdly, construction companies are often working abroad in developing countries where laws, regulations and ethical standards are lower (Ameyaw et al., 2017). Fourthly, due to project unicity, construction engineering companies have numerous business partners helping them achieve their goals. Despite efforts to produce codes of ethics and conduct, it has been discussed that construction engineering industry is ineffective for its implementation and that there is a lack of training and understanding (Oladinrin & Ho, 2016). Managing integrity internally is easier than externally. Even with all due diligence, a business partner could conduct unethical activities damaging company's integrity (Deloitte, 2016a). To protect their integrity, construction engineering companies need to assess and mitigate the risks of their business partnerships.

2.2.2 Business partners in the construction industry

Major construction and engineering companies often expand beyond national borders and depend on third parties. In some cases, over 90% of the value of a contract is transferred to these third parties (Watson & Serra, 2016). The most popular types of partnerships are public-private partnerships (PPPs), joint ventures and consortiums, and business developments, each having their own advantages and disadvantages.

The global financial crisis of 2007-2008 was the start of the boom in public-private partnership (PPP) projects (Osei-Kyei & Chan, 2015). Often presented as cheaper and involving lower risks, PPP has numerous major impacts, which often last for generations (Bloomfield, 2006). That said, PPP faces criticism because a complete and true partnership is impossible if partners do not share the same objectives (profit, for companies; social service, for government). Furthermore, healthy competition in these cases is impossible, because very few companies can afford to finance such projects (Hodge & Greve, 2017; Zhang, 2005). Despite these disadvantages, PPP is valued by governments because it makes major infrastructure projects possible.

The last decade has seen a jump in the popularity of joint ventures and consortiums. A joint venture is an entity formed between parties to undertake economic activities, whereas a consortium is an association between parties to achieve a common objective. These partnerships are difficult because each party is acting both as an associate and as a competitor at the same time (Ozorhon et al., 2008). This can lead to conflicts of interest and collusion issues and must be managed properly.

Business development is linked to the organization's strategy and is part of its business model (Smyth et al., 2016). Whether we are talking about prospecting new clients, working with sales agents or lobbyists or marketing, business development is crucial for construction and engineering companies (Conseil du trésor, 2011). The organization is strongly impacted should a business partner act in a less-than-stellar fashion since the partner is considered as a de facto representative of both entities, and to be acting on behalf of this organization. These types of partnerships are associated with a higher risk for companies. It is common to see compensation based on sales or successful completion of tasks for these partnerships. This can easily tempt ill-intentioned individuals to engage in corruption and bribery (Teichmann, 2018).

Several other types of business partner relationships exist, including consulting services, visa or customs services, local sponsors, and recruitment firms. Local sponsors are common in many countries, particularly in the Middle East, for oil development projects (El-Sabek & McCabe, 2018).

2.2.3 Risk management

Initially, experts did not include construction risks that are considered uninsurable, such as morality, third party-related, etc. The latter are closely related to perception, which implies that each person or company has a different way of viewing, understanding and interpreting them (Coeckelbergh, 2012). Emotions and perception are often overlooked in engineering risk management (Richter & Paretti, 2009). Also, the engineer training curriculum limits the capacity to address issues from perspectives other than seeking technical solutions

(Guntzburger et al., 2018). Risk management professionals in construction engineering must therefore include social sciences and perception to have an accurate representation of the situation. To manage risks related to morality, companies draft codes of conduct and ethics.

2.2.4 Integrity-related risks

Following a review of four codes of ethics and business conduct from major players in the construction and engineering industry, five integrity-related risks have been identified: 1) risks associated to human rights, 2) competition & antitrust, 3) corruption, 4) compliance with regulations and 5) conflict of interest (CIMA+, 2018b; SNC-Lavalin, 2019; Stantec, 2017; WSP, 2018).

Human rights and modern slavery constitute a major issue for companies' integrity. Construction engineering industry requires a lot of materials and temporary migrant workers for major projects (Anderson, 2015; Millward, 2017). Currently, more than 40 million people are modern slaves (Anti-slavery international, 2018). Modern slavery generates illegal profits estimated at 150 billion USD annually (Institute of development studies, 2018). Working conditions are also part of this issue, considering the major impacts on the reputation following a deadly incident.

Anti-collusion measures and antitrust laws are mandatory for a competitive market. In construction and engineering, criminals use four techniques to create an apparently competitive market (Conseil du trésor, 2011). They consist of (1) the creation of fake bids with abnormally high prices, (2) a long-term pattern of rotating winners, (3) contract distribution to the same bidders, and (4) suppression of bids without notice or reason (Locatelli et al., 2017).

Corruption is abuse by an entity in a position of authority for personal gain, with bribery being its most common form. The annual cost of corruption represents more than 5% of global gross domestic product, standing at an estimated 3.5 trillion USD lost each year (OECD, 2014b).

Corruption increases inequality, especially in developing countries, while reducing the overall efficiency of services and products.

Compliance is expected to be more complicated and expensive with increasing regulations. Money laundering and tax evasion affect taxpayers and governments. Not reporting income from foreign sources and tax scheme promotion lead to criminal prosecution (OECD, 2012). Non-compliance with economic sanctions leads to adverse consequences for companies. Since such sanctions are constantly evolving, they must keep abreast of current political events.

Even where they are only apparent and well managed, conflicts of interest often feature in adverse media coverage. Managing conflict of interest is necessary for objective decision-making, especially in public services (OECD, 2003a).

2.2.5 Factors influencing and predicting risk

To ensure an efficient risk management process, companies assess risks according to different factors. According to two third-party risk management references (Dow Jones Risk & Compliance, 2018; NAVEX Gobal, 2018), six main factors can predict and influence integrity-related risks for business partners. The six main factors to be considered in predicting integrity-related risks are: type of industry, contract complexity, proximity to public officials, type of third party, country, and partner profile.

2.2.5.1 Type of industry

A survey on bribe payers with more than 3000 business executives respondent (Transparency International, 2011) revealed the likelihood of bribes being paid by companies in 19 different industries. Public works contracts and construction, oil and gas and mining are the most affected. An analysis of foreign bribery cases concluded between 1999 and 2014 identified the industry of guilty companies (OECD, 2014a). Extractives came first with 19% of the cases and construction followed with 15%.

Type of industry can also reveal potential human rights and environmental issues. Some industries prioritize low wages with lower-skilled workers in abundant supply and seen as expendable (Blanton & Blanton, 2009). Self-regulation is directly related to Corporate Social Responsibility (CSR) (Dashwood, 2014). Therefore, the level of self-regulation can predict company's behaviour (Nysten-Haarala, Klyuchnikova, & Helenius, 2015). Oil and gas and mining industries are the least self-regulated and among the most internationally active industries (Philp, 2012).

2.2.5.2 Contract complexity

Contract complexity is ambivalent in that some people consider it as a catalyst for risk and others as a real factor; a catalyst because a multi-billion-dollar project would get more exposure and media scrutiny if a company were to be found guilty (Chang, Deng, Hwang, & Zhao, 2018). Also, because the philosophy underlying integrity-related risk management is that even the smallest act of corruption is punishable, and a project size should not affect how a company deals with ethics and compliance (Scalza, 2008). Notwithstanding this perspective, project characteristics define corruption vulnerability (Locatelli et al., 2017; Nordin, Takim, & Nawawi, 2013), as shown in Table 3. Finally, accountability for each risk in a complex contract is challenging for managers. Therefore, contract complexity is arguably a factor influencing integrity-related risk evaluation.

2.2.5.3 Proximity to public officials

Major projects often involve government and public officials. The main concern with this factor is identifying if the relation involves a government agency or determine how much ownership, control or influence is related to the government (Dow Jones Risk & Compliance, 2018).

This factor is directly related to bribery and corruption risks (Ernst & Young, 2013). Construction requires a lot of planning permission and licences, which can lead to abuse (e.g., bribe to a public official for a faster work acceptance) to avoid cost or time overruns. Also,

Clicours.COM

public or private funding projects in developing countries require many interactions with government officials (directly related to the country's corruption perception index). Finally, proximity to public officials can also lead to conflicts of interests (OECD, 2003b).

2.2.5.4 Type of third party

Some types of third parties elevate the risk associated with corruption and bribery. The highest risk lies with third parties who are authorized to represent the company (Transparency International UK, 2016), such as a business development consultant, commercial or sales agent, mandatory local partner, or lobbyist. The UK Bribery Act introduced a liability offense for companies who fail to prevent bribery (United Kingdom, 2010). Therefore, evaluating risks associated with the type of third party is mandatory to protect the company's integrity.

2.2.5.5 Country

Country is a non-negligible factor in evaluating risks. Indeed, organizations produce annual data such as the corruption perception index (Global coalition against corruption, 2018) to that end. A Dow Jones survey revealed that more than 80% of companies risk rank the countries of their third parties as part of their review process (Dow Jones Risk & Compliance, 2018).

Country-based risks include the geopolitical situation, laws, regulations and sanctions. Geopolitical situation and sanctions are closely related, with many developed countries using sanctions as a foreign policy tool to signal the need for a change in behaviour or policy of a specific country or region (Lektzian & Patterson, 2015). Moreover, country-based assessments could reveal risks in terms of tax havens, tax evasion and money laundering with the financial secrecy index (Tax Justice Network, 2018). Finally, the country can also be an indicator of the human rights situation, and many renowned organizations, such as Human Rights Watch and the United Nations, address this issue through annual country-based reports and rankings (Human Rights Watch, 2018; United Nations, 2018).

2.2.5.6 Partner profile

Historical dealings with a particular third party should be reviewed, and the occurrence of unusual events analyzed (NAVEX Gobal, 2018). Furthermore, the third party's risk aversion and fit with the company must also be considered (Ozorhon et al., 2008). Adverse media coverage of past misconduct influences the assessment and the level of due diligence and scrutiny necessary for a third party. In some cases, this can in fact be an advantage because sanctions and prosecution often lead to redemption and very strong compliance measures. Partner profile also includes the type of compensation and payment terms required by the third party. A great indicator of money laundering or tax evasion here could be if the partner asks for a payment in an offshore institution, for example (Chong & Lopez-De-Silanes, 2015). Traditionally, blocking sanctions are applied to individuals and entities, as well as to entities that are majority-owned by them. In this regard, the Office of Foreign Assets Control (OFAC), for example, publishes the Specially Designated Nationals and Blocked Persons List (SDN) (United States of America, 2018). Furthermore, considering the partner profile could reveal potential conflicts (OECD, 2003b).

2.2.6 Performance analysis

Performance analysis is used to gain strategic advantages. Adjustments and improvements to business processes are necessary in a constantly evolving world (Cokins, 2013). Ethical leadership requires the capacity to assess a complex situation from the perspectives of many (Lawton & Páez, 2015). According to the concept of ethics of responsibility, leadership is not generated by the self, but through engagement with the others and a sense of responsibility (Knights & O'Leary, 2006). Therefore, an analytic tool for integrity management must be interactive and not solely involve decision makers. Many measurement and analysis methods exist for business management. The Political, Economic, Socio-cultural, Technological, Legal and Environmental (PESTLE) analysis and the Porter's five forces analysis investigate the external environment of an organization (Cadle, 2010). The Mission, Objectives, Strategy and Tactics (MOST) analysis and the Boston Box investigate internal capabilities. Risk management depends on the external environment to create the risks and the internal

capabilities of the organization countering them. While being originally used as a strategic development tool, the Strength, Weakness, Opportunity and Threat (SWOT) analysis have been adapted and used in many different contexts including construction engineering ones (Rao et al., 2018; Zavadskas et al., 2011). The strength and weakness can investigate internal capabilities while the threat and opportunity investigate the external environment. This method can also be interactive by combining the answers of different parties. This analysis specifies the target objectives, while identifying internal and external, and positive and negative constraints. SWOT analysis useful for strategic planning, especially if the analysis is conducted with a specific objective, such as taking advantage of a new business opportunity or implementing a new technology (Houben, Lenie, & Vanhoof, 1999). Additionally, SWOT analysis can be modified and adapted to specific situations other than general business management (Kangas, Tikkanen, Leskinen, Kurttila, & Kajanus, 2017; Njoh, 2017; Quezada, Cordova, Palominos, Godoy, & Ross, 2009).

2.2.7 Ethical companies

Often, the most ethical companies used to be the exact opposite. Strong penalties, financial difficulties and other negative effects really act as an eye-opener. To survive, these companies must have put in place strong compliance measures that led to redemption. As an example, Fluor, a major construction engineering firm, is now on Ethisphere most ethical companies list despite past scandals related to fraud and others (Lu et al., 2016).

2.3 Case study methodology

2.3.1 Presentation of the company

Following various corruption-related events in Qadhafi's Libya (Hachey, 2012) and its debarment from World Bank-financed projects for ten years (World Bank, 2013), SNC-Lavalin made drastic changes to its governance policies. With the creation of a department dedicated solely to protecting the company's integrity and preventing such events from happening again, SNC-Lavalin is now a leader in ethical and compliance management and earned the prestigious

Compliance Leader Verification from the Ethisphere Institute in 2019. After creating policies to manage integrity and conducting their first integrity-related risk assessment in 2014, the company never stopped improving their program and their CEO earned a chair at world economic forum global anticorruption initiative.

Third-party risk management is mandatory in the company, and thousands of potential business partners are checked annually. The database contains around two thousand active business partners, which is a small number compared to the hundreds of thousands of business partners of financial institutions but is still a challenging amount to monitor due the variety of activities and relationship to the engineering company. The goal is to propose a methodology for construction engineering companies to evaluate which indicators could reveal integrity-related risks and to include experts' opinion using the SWOT analysis and a survey.

2.3.2 Current practices in business partner risk ranking

At SNC-Lavalin, business partners are risk-ranked based on a series of questions and an Integrity Check. Points are assigned to each question and the sum of the assessment distinguish low, medium and high-risk partners. Questions for the business partner evaluation cover specific risk factors, as shown in Tableau 2.1. Contract complexity and type of industry were not yet covered by the questions. Also, some risk factors were covered in greater detail than others; an example is the third-party type as compared to the country risk. Finally, the Integrity Check covers three Dow Jones lists (Dow Jones, 2016): Watch lists (Public Services and Procurement Canada, World Bank and other development banks lists of ineligible entities and economic sanctions imposed by various governments), Politically Exposed Person/State Owned Company and Adverse media coverage, and one list from SNC-Lavalin's references.

Tableau 2.1 Risks covered by the current business partner compliance tool (SNC-Lavalin)

Questions	Risk factors
Will the Business Partner conduct business development for SNC-Lavalin	Type of third party
For this specific engagement, will the business partner be directly or indirectly interacting with government officials	Type of third party and proximity to public officials
Has the business partner been recommended by government officials?	Proximity to public officials
What is the purpose of the engagement?	Type of third party
All countries where the business partner is expected to perform his mandate with or on behalf of SNC-Lavalin must be selected. Also add the home base country of the business partner.	Country
How is the business partner compensated by SNC-Lavalin (payment or other benefit)?	Partner profile, type of third party
Has the business partner requested any unusual payment terms or rates such as cash only, payments to third parties or to an account in a country other than the one where it is based or where the services will be rendered?	Partner profile
Check against the Integrity Database	Partner profile

2.3.3 Case Participants/Experts

The survey was conducted among 14 SNC-Lavalin's employees, including the 6 sector officers, 7 regions officers and the corporate officer (Figure 2.1). Experience and knowledge of the experts were the two main characteristics for the selection. The participants needed to have a comprehensive view of the risk management situation in the company and to have enough expertise on integrity, ethics and compliance. The officers have different backgrounds and come from different countries and industries. This heterogeneous population is composed of lawyers, engineers, business administrators and human resources specialists from United States, United Arab Emirates, India, and more. At company scale, this population is representative and covers most business units of the company.

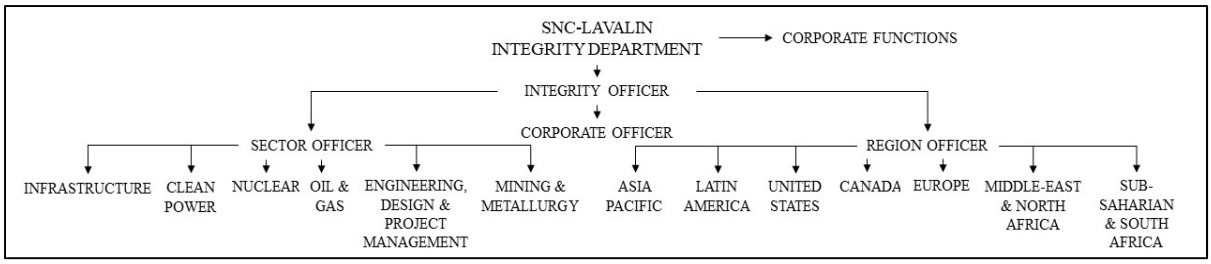

Figure 2.1 Demographic data of the respondents

2.3.4 SWOT and survey analysis processes

A qualitative approach was used in conducting a SWOT analysis of the business partners' tool. The first step of the process involved a survey of the 14 experts at SNC-Lavalin. The results of the survey gave fragmented agreement for each SWOT category. Also, it gave the perception of the experts regarding the different risk factors and their influence on specific risks. For this research, a modified version of the SWOT analysis was used. Since the analysis pertains to a management tool rather than general economic/business performance, the main objective was not necessarily related to profit and economic gains. Opportunities were replaced by positive developments because they are associated with a better understanding of the risk factors, new data or tool, laws and others in integrity related-risks management. The strengths and weaknesses are related to the current tool, and the threats to forthcoming risks in the engineering and construction industry. The survey to the participants was divided into five sections, each one addressing a risk determined through the literature review: Antitrust & Competition, Conflict of Interest, Compliance with Regulations (trade, money laundering, and tax), Human Rights, and Corruption & Bribery. The six risk factors stated in the literature review were used, and respondents needed to rank them. A ranking of 1 for Country regarding Corruption & Bribery means that Country is the best indicator allowing the detection of corruption and that would give Country 6 points for this risk in the survey (Tableau 2.3). Non-applicable gives 0 points. The research and analytic process used is shown in Figure 2.2. The scores for the risk indicators were gathered in a single table where an average was made. The

answers to the SWOT categories were analyzed to find recurring answers and include them to the final SWOT themes.

Tableau 2.2 Points allowed for the score per risk according to the rank

Rank from best indicator (1) to worst (6)	1	2	3	4	5	6
Points allowed	6	5	4	3	2	1

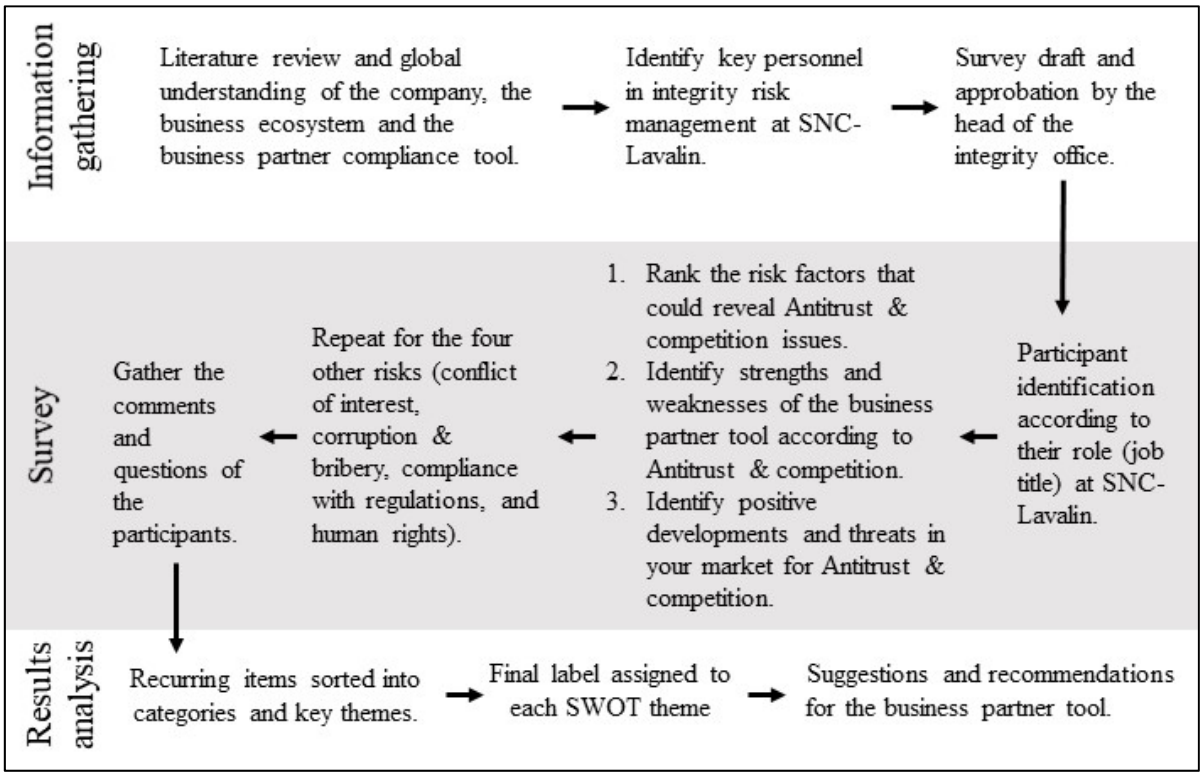

Figure 2.2 Research and analytic process

2.4 Case study results

2.4.1 Risk indicators

2.4.1.1 Results

Consolidated results of the risk factors consisted of an average of fourteen different respondents (Tableau 2.4). Tableau 2.4 presents the capacity of each risk factors to detect each integrity-related risk according to the survey's answers. A score of 0 means that the factor was useless at detecting the risk, and the closer it got to 6, the better it is at detecting the risk. The green boxes in Tableau 2.4 represent the best risk factor for each integrity-related risk. The standard deviations of the respondents' answers for each of the risk factors are then presented (Tableau 2.5). The green boxes in Tableau 2.5 represent low standard deviations, while the red ones show high standard deviations. A high deviation is related to a divergence in opinions between the respondents.

Tableau 2.3 Risk indicators importance regarding each risk according to SNC-Lavalin's 14 experts

Risk indicators	Average score per risk				
	Antitrust & Competition	**Corruption & Bribery**	**Human Rights**	**Conflict of Interest**	**Compliance with Regulations**
Proximity to Public Officials	2.4	4.9	1.1	4.6	3.0
Country	2.6	4.7	4.9	2.1	4.7
Partner Profile	3.3	3.1	3.9	3.4	2.9
Type of Third Party	5.0	3.7	3.1	5.7	3.7
Type of Industry	3.7	2.1	3.9	2.0	3.1
Contract Complexity	3.6	2.4	1.9	2.7	3.4

Tableau 2.4 Standard deviation for each score of the Tableau 2.3

Risk indicators	Standard deviation				
	Antitrust & Competition	**Corruption & Bribery**	**Human Rights**	**Conflict of Interest**	**Compliance with Regulations**
Proximity to Public Officials	1.99	1.46	0.82	0.98	1.63
Country	1.9	1.11	0.82	1.87	1.89
Partner Profile	1.25	1.95	0.55	1.27	1.97
Type of Third Party	0.82	1.11	1.3	0.49	0.76
Type of Industry	2.56	1.46	1.68	0.82	2.19
Contract Complexity	1.27	1.51	0.41	1.47	1.51

2.4.1.2 Findings and analysis

By analyzing the survey answers, it was determined that type of third party is crucial for both antitrust & competition and conflict of interest. The highest risk lies with partners who are authorized to represent the company. Country is a main indicator for three of the five major risks at SNC-Lavalin and it is an important indicator of corruption perception, human rights status and financial secrecy. Partner profile was consistently grade ranked for the five risks (more consistent than the first and second indicators). Indeed, partner profile provides data for each risk (past behaviour for corruption, competition and human rights, relation for conflict of interest and payment/financial information for compliance). Proximity to public officials did not score highly for most risks, this indicator is however critical for corruption and conflict of interest, especially in riskier countries highlighted by Transparency International. The combination of this risk factor with country or type of third party can reveal a strong risk of corruption & bribery or conflict of interest. Type of Industry acts as a significant indicator for antitrust & competition and human rights. As mentioned, industry self-regulation is a great indicator for the different risks. Finally, contract complexity has a significant impact on antitrust & competition, and compliance with regulations.

The standard deviations show mixed perceptions for the type of industry. Indeed, the two greater deviations are for this factor, meaning that some respondents consider it meaningful, while other less. This could be explained by the nature of the respondents. A sector integrity officer has a narrower overall view of the other sectors, which leads to a biased judgment of his own sector. This trend also appears, but less drastically, for the country. The main factor affecting the standard deviations is the region and sector integrity officer's biases. Also, the standard deviations show that the results for human rights and conflict of interest are very stable as compared to the other risks. As discussed, it is necessary to include perception in risk management, especially for integrity-related risks. More than half of the factors have a relatively high standard deviation, and this should be reflected in the business partner compliance process. However, for a major company like SNC-Lavalin, it is crucial to adhere to a single prescriptive business partner compliance process. The integrity department receives cases from different business units, and consistency allows officers to avoid mistakes.

2.4.2 SWOT

2.4.2.1 Results

For the SWOT analysis, the results were gathered for the risks (Figures 2.3 and 2.4)

Clicours.COM

• **Antitrust & Competition**: Integrity check (IC) could raise existence of such behavior in the past and disclose relations with government officials, and the questions about the type of engagement and the scope of work. • **Conflict of Interest**: IC could identify ties/close relationship with government officials and questions detect experience and maturity of a partner's ethical culture. • **Compliance with Regulations**: IC could identify parties subject to sanctions or known for participating in fraud schemes, identification of the country where the work is executed and payments are made and audited financial reports. • **Human Rights**: Record keeping, requirement for supplier code of conduct and identify business partner's potential use of subcontractors. • **Corruption & Bribery**: Tool was designed to address this specific risk.	• **Antitrust & Competition**: No questions to determine vertical markets, similar agreements that business partner has with others, dominance in the sector, and not project-specific. Ongoing monitoring of partner's relationships. • **Conflict of Interest**: No conflict of interest disclosure asked and nothing to prevent a conflict between the originator and the partner. Ongoing monitoring of changing situations. • **Compliance with Regulations**: Sanctions and tax require shouldn't be automated, low-risk if the engagement is in a country subject to sanctions, tax havens or known to facilitate money laundering. • **Human Rights**: No specific question about human rights and need to go beyond media searches with ongoing monitoring. • **Corruption & Bribery**: The risk for our business partner's third parties are not addressed and beneficial ownership is not enough covered.
STRENGTHS	WEAKNESSES

Figure 2.3 SWOT results for each risk for the current business partner tool

POSITIVE DEVELOPMENTS	THREATS
• **Antitrust & Competition**: Awareness through investigations such as the Charbonneau Commission, in-house expertise on Antitrust and transparent books and records. • **Conflict of Interest**: Political events shine light on conflict of interest and transparent declaration. • **Compliance with Regulations**: Sanctions will demonstrate willingness to prosecute, lots of information are available to educate companies and thorough auditing projects/cases. • **Human Rights**: Reinforced legislative framework and collaboration of key countries to address this issue. • **Corruption & Bribery**: Cases in the media and prosecutions, increased awareness among employees and books & records keeping.	• **Antitrust & Competition**: Special Purpose Vehicle and Joint-Venture, antitrust enforcement is on radar for the Department of Justice and difficult to detect. • **Conflict of Interest**: Revolving door of private-public jobs, not enough communication (external relationships). • **Compliance with Regulations**: Political instability (shifting regulatory environment) and Office of Foreign Assess Control heightened awareness. • **Human Rights**: Turning a blind eye, construction industry creates many opportunities for abuse, lack of legislation and increased scrutiny from media and NGO's. • **Corruption & Bribery**: Rogue employees, sales objectives, ignorance and revolving door for public/private jobs.

Figure 2.4 SWOT results for each risk for the current business partner tool

2.4.2.2 Findings and analysis

The results for antitrust & competition confirm the importance of the indicator type of third party. As mentioned in the literature, some relationships elevate the risks and, in this case, a joint venture or a consortium could reduce the number of bidders and affect healthy competition. Also, proximity with public officials can reveal potential collusion particularly if the partner is working in business development. The results also confirm the necessity to include the type of industry and contract complexity indicators in a future tool because, as mentioned, they could reveal risks associated to a cartel in the construction engineering industry. The SWOT results concord with the score per risk (Tableau 2.3).

The results for conflict of interest confirm the importance of the indicators proximity with public officials and type of third party, particularly if the partner is working in business development for a public project. The results also highlight the importance of going deeper into partner profile since it could reveal internal conflict of interest between the partner and the originator. The SWOT results concord with the score per risk (Tableau 2.3).

The results for compliance with regulations confirm the importance to include the country indicator because sanctions are often on a country and there is a lot of data produced about financial secrecy and tax havens. The results also highlight the importance to adjust the risk level according to the country indicator since it is considered the most important for that risk (Tableau 2.3). Finally, including contract complexity and going deeper into the partner profile can uncover beneficial owners whom could be sanctioned, as mentioned. The SWOT results concord with the score per risk (Tableau 2.3).

The results for human rights confirm the importance of the country indicator to detect risks related to human rights. Indeed, many organizations produce country reports and rankings. It also highlights the importance of the partner profile indicator because adverse media coverage could reveal breaches in human rights. The results do not include the type of industry indicator even if it was ranked as an important one in the score per risk (Tableau 2.3). As mentioned,

lower-skilled workers' industries tend to see human rights as less important (Blanton & Blanton, 2009).

The results for corruption & bribery confirm the importance to include the country, proximity with public officials and type of third party indicators. Many organizations produce annual rankings on corruption per country and a third party who is authorized to represent the company with ties to public officials could reveal important risks of corruption and bribery. The results also highlight the importance to cover the partner profile deeper since it could reveal potential beneficial owners. The respondents did not include contract complexity even if the literature demonstrates that it could be an important indicator. The results concord with the score per risk (Tableau 2.3).

2.5 Discussion

Integrity and ethics management are constantly evolving. Associated data, population perception, technologies and legislation are changing, and the tool of the trade needs to reflect that (Slagmulder & Devoldere, 2018). A comprehensive view of the whole process is necessary for a complete improvement. A good assessment is useless if it cannot be adjusted over time with the help of ongoing monitoring and tracking of the business partner. Furthermore, regulatory, data and technological monitoring are necessary to keep the whole process up to date. A process that does not include the latest laws or data becomes irrelevant very quickly.

This research highlighted the different indicators detecting integrity-related risks in construction engineering. It revealed the necessity to include them all for a complete third party's risk assessment. As mentioned, risk managers need to process with a holistic view for better results (Mhetre, 2016). Depending on the risk, some indicators are very critical and others less. It also demonstrates that using the SWOT analysis could be useful for companies wishing to improve their integrity tools. Indeed, the survey revealed gaps that need to be considered while modifying the tool. SWOT enabled integrity officers across different sectors and countries to give their opinion and participate. As mentioned, integrity management and

ethical leadership must be interactive (Bonn & Fisher, 2005). The flexible approach used also served as an indicator to assess the quality of the company's tool and employees were enthusiast to be part of this study.

2.5.1 Risk indicators

The weighting of the new scoring system should draw from the survey's ranking of the risk factors. However, only taking these into account would not be reliable. Indeed, some indicators are very critical in specific projects or situation. For example, proximity to public officials in a country with a high perceived level of corruption is a very critical indicator (PACI, 2013). Also, a complex contract requiring payments in a country known for tax havens should also be viewed as a critical indicator. The reviewed indicators often interact and should not be assess separately only. Therefore, findings suggest that a good tool should include a scoring system based on the indicators' results in the survey, with exceptions based on past events or expert opinion. Finally, findings also suggest strategical use of data. As an example, the originator of the business partner must choose the country in the tool and compares it to the corruption perception index. This data could also be used for compliance with regulations (tax haven, financial secrecy, etc.) and human rights (score by country).

2.5.2 SWOT

2.5.2.1 Strengths

According to the findings, the main strength for all the risks is undoubtedly the Integrity Check. By looking into this database, SNC-Lavalin covers entities owned or controlled by public officials or states, worldwide adverse media coverage, and sanctioned entities. The integrity check partly covers the five risks and provides information for subsequent investigations. Also, due diligence questions about partners' experience help determine the maturity of their ethical culture. If the scope of the partnership is considered risky and the partner has a low level of maturity, it could be a red flag. Asking for audited financial reports before entering a partnership can also reveal irregularities and red flags. Furthermore, asking for the partner's

supplier code of conduct and for their subcontractors could reveal human rights risk, especially if the project is in a risky country or industry (McCorquodale et al., 2017). Finally, the last strength is the effectiveness of the tool for the corruption and bribery risk, since it was designed for it specifically.

2.5.2.2 Weaknesses

Ongoing monitoring was one of the main weakness of the integrity tool. It is already automated in the current tool and generates many notifications. The filter used by the company generates many false positives. Another weakness concerns tax evasion and money laundering. Sanctions are already being treated separately by another business unit at SNC-Lavalin, but the tool should reveal possible breaches of compliance with regulations and notify those concerned. As mentioned, these risks evolve frequently according to the geopolitical climate (Lektzian & Patterson, 2015). Finally, even if the current process asks for third-party subcontractors, no further investigation is made regarding their risk of engaging in corruption and bribery.

2.5.2.3 Positive Developments

The positive developments were all related to more laws and regulations and access to information. Integrity and CSR originate from a greater public awareness about ethical issues. Integrity and CSR being relatively new, it makes sense that laws and regulations are evolving significantly and currently improving. Governments are enforcing laws and penalties. As mentioned, positive developments also come from industry self-regulation and awareness which are directly related to the level of CSR (Nysten-Haarala et al., 2015).

2.5.2.4 Threats

Threats in this context are multi-faceted. In a way, laws and regulations also act as threats because following the evolving regulatory framework in dozens of countries could lead to mistakes or omissions. Moreover, globalization has led to complex supply chain. Keeping track of all the activities is challenging (CIOB, 2016). Finally, staff turnover has increased in the last

decades. Professionals rarely stay in the same companies for their entire career. Moving from a private to a public employer or vice versa could lead to competition, conflict of interest and corruption issues if not managed adequately.

2.6 Conclusion

By reviewing the literature and analyzing the data from the survey, gaps in the current risk assessment tool were identified, and suggestions for the future business partner compliance tool were made regarding the integration of other risk indicators, the strategical use of data and the interactive process in integrity management. A survey was created to investigate the perception of experts using the current tool on an almost daily basis. There was very high interest among participants for improving the current tool. Some risks like human rights and conflict of interest were not actually covered, while they are part of the integrity department's objectives. It was found that the integrity check is the best component of the current tool. Also, emphasizing the type of third party in the current tool is good since experts identified it as the best indicator. Opinions and perceptions provide many aspects regarding the indicators and the type of question to be considered while designing the next tool.

The study was conducted at SNC-Lavalin and the views presented by the experts reflect some of the integrity management team's perspective. Very few experts can provide accurate answers on these issues, which means that it is not possible to create a survey to obtain a larger dataset in the company, even with 50 000 employees. The high standard deviations and the limited number or respondents make it impossible to draw a solid conclusion for the risk indicators results. Thus, it means that a survey must address multiple companies to obtain statistically meaningful results. The challenging question is which organisation can support a survey on the business partners risk indicators in the construction and engineering sector. Further research should focus on different types of companies, such as contractors or engineering consultants. Also, the company's past influences its current behaviour and its risk aversion. A company involved only in the local market would not have the same risks and indicators in comparison to a multinational company. More study like this one could help

standardize integrity management and organizations with less financial resources could benefit from this by implementing integrity tool and processes at a low cost (the same organization who sometimes act as third party for multinationals) resulting in a more transparent, honest and fair industry.

2.7 Acknowledgements

This research was fully supported by SNC-Lavalin and Mitacs. We thank our dear colleagues from the Integrity department who provided great expertise to assist in the research.

cliCours.com

CHAPITRE 3

METHODOLOGY TO CONDUCT THIRD PARTY'S RISK BASED DUE DILIGENCE IN CONSTRUCTION ENGINEERING INDUSTRY

Vincent Roy[a], Dominique Desjardins[b], Camille Fertel[c] , Claudiane Ouellet-Plamondon[d]

[a,d] Département de Génie de la construction, École de Technologie Supérieure,
1100 Notre-Dame Ouest, Montréal, Québec, Canada H3C 1K3
[b] Département intégrité , SNC-Lavalin,
455 René-Lévesque Ouest, Montréal, Québec, Canada H2Z 1Z3
[c] Economist consultant, Montréal, Québec, Canada

Article soumis pour publication au Journal of Business Ethics, juin 2019

Abstract:

This paper aims to propose a methodology to conduct third party's risk-based due diligence in an engineering and construction company. A case study will present the methodology for a multinational firm. Due diligence is necessary and often mandatory depending on the client or project. Due diligence protects company in case of an ill-intentioned third-party and it has been overlooked in many industrie resulting in ethics and compliance related misconducts. This study finds that risk-based due diligence has been widely applied and discussed by brokers and accountants, but reveals that no research has verified if these principles apply to construction and engineering industry. The case study also insists on the importance of knowing and understanding the company's business model, appetite for risk and global interactions within their industry. The proposed methodology enables risk assessment and due diligence for integrity related-risks of third parties. By adapting the model to their reality, construction and engineering companies manage third parties' risks related to corruption & bribery, antitrust & competition, human rights, conflict of interest and compliance with regulations.

Clicours.COM

Keywords: Integrity, Construction, Engineering, Third party, Risk-based due diligence

3.1 Introduction

Construction and engineering companies face major challenges and are forced to adopt strict compliance measures. As for many industries, corporate social responsibility is now a key factor to success (Liao, Xia, Wu, Zhang, & Yeh, 2017). Indeed, they must implement an ethical culture across the company and face many challenges doing so. To regulate their activities, construction and engineering companies write codes of conduct and ethics. Companies need to conduct their business activities, with integrity, according to their codes of ethics to form a coherent whole. For the sake of this study, four codes of conduct and ethics from major canadian construction and engineering companies were used to identify the main integrity related-risks in that industry. Corruption & bribery, collusion & competition, conflict of interest, conformity to tax laws & sanctions, and human rights were identified as the five biggest integrity risks (Cima+, 2018a; SNC-Lavalin, 2017; Stantec, 2017; WSP, 2018).

Organizational identity is often define through these codes and when it is congruent with the company's reputation, trust develops among stakeholder and general public (Joshi & McKendall, 2018). Many argued about the importance of partnerships in the construction engineering industry. Projects size and complexity force organizations to combine their assets. These partnerships increased projects' performance while also increasing third party related risks (Gadde & Dubois, 2010; Sedita & Apa, 2015). Risk-based due diligence is now necessary if construction engineering companies want to stay competitive and protect their assets. Organizations focusing on minimizing or reducing the cost of risk management tend to have higher stock price volatility, while those who adopt a comprehensive approach considering the positive and negative impacts have a higher firm value (Ittner & Keusch, 2017).

The global construction market is expected to grow by 8 trilion USD by 2030, for a total size of 17.5 trilion USD (Oxford Economics, 2015). It is estimated that by 2030, construction will represent almost 15% of the global Gross Domestic Product (GDP) compared to 12,4% in

2014. Many have discussed that construction is prone to corruption (Hess, 2018) and that companies rely mostly on third parties while working in new markets (Watson & Serra, 2016). These international third parties do not necessarily share the same perspective about business behavior, morality and ethical responsibilities (Gaughan & Javalgi, 2018; Hamilton & Knouse, 2001).

Third party related incidents have increased and impacted companies' reputation and finance (Watson & Serra, 2016). In a global survey grouping 170 organizations, it has been estimated that more than 85% of the respondents have faced a disruptive incident because of third parties in the past 2 or 3 years (Deloitte, 2016a). In the same survey, more than 90% of the respondents have a low to moderate level of confidence in technology used to manage third party risk and more than 85% have the same level of confidence for the quality of the risk management process. Within this context, the aspired theoritical contribution of this research is to propose a methodology to conduct third party risk management for construction engineering companies with a format based on the financial sector and content on an internal survey conducted in a multinational firm (Roy & al., 2019b).

A recent survey among integrity, ethics and compliance experts at SNC-Lavalin highlighted the necessity for an improvement of the business partner compliance process. Business partners can be defined as an entity who has some involvement with another entity's business activity. The process, in the form of a tool, was mostly designed to cover corruption risks without necessarily integrating all integrity-related risks. It was implemented in 2014 following corruption related misconducts and prosecutions. Thousands of potential partners are screened annually by the business partners' compliance tool. The desire of continual improvement led to this study. SNC-Lavalin is a major player across five industries (Infrastructure, Mining & Metallurgy, Clean Power, Oil & Gas, and Nuclear) and has offices in more than 50 countries with worldwide projects. With more than 50 000 employees, the business partner compliance tool needs to be effective and comprehensive, while assuring company's integrity. A case study of SNC-Lavalin will demonstrate that methodology.

3.2 Literature review

3.2.1 Implementing a corporate ethical culture

Corporate culture is one of the most powerful influences on decision-making and strategy (Schein, 2010). It is linked with leadership and organization structure. Culture can be a competitive advantage, but can also contribute to destructive behaviors such as excessive rivalry, intolerance of failure, secretiveness, propensity for risk taking and persecution of whistle-blowers (Drew, Kelley, & Kendrick, 2006). Companies face many leadership and organizational challenges when implementing an ethical culture.

Leadership does have a dark side (Conger, 1999; Johnson, 2018). Indeed, the skills and traits that pushed the leader to the top may also cause unrealistic and inappropriate strategies (Vries, 1993). Charismatic and visionary leaders are often less willing to entertain competing viewpoints resulting in a sense of omnipotence caused by the uncritical and blind obedience of their ‘’followers’’ (Khurana, 2002). However, a study demonstrated that charismatic leadership enhance support from external investors, especially in difficult economic conditions (Flynn & Staw, 2004). Researchers suggest seven leadership mechanisms to establish an ethical climate in organizations (Grojean, Resick, Dickson, & Smith, 2004):

1. Using values-based leadership,
2. Setting an example,
3. Defining ethical conduct,
4. Providing feedback and support regarding ethical behavior,
5. Recognizing and rewarding behaviors supporting organization’s values,
6. Considering individual differences among employees,
7. Establishing leadership training.

Adopting an appropriate organizational structure to implement an ethical culture is necessary. Indeed, as an example, the roles of CEO and chairman used (and are still in many organizations) to be combined leading to a large number of insiders on boards (Drew et al., 2006). Despite some arguing the positive effects of a combined role, such as specific

knowledge and commitment to company's affairs, a study revealed a correlation between the increasing number of outsiders on a board and the reduction of corporate wrongdoing by analyzing fraud incidents in the United States from 1978 to 2001 (Uzun, Szewczyk, & Varma, 2004). The common pattern in many corporate scandals is the abuse of power at the top. Therefore, some suggest a greater decentralization of power and a more interactive and democratic management approach. As for society, participatory systems are ethically better than autocratic organizations (Collins, 1997). While participation across the organization is a factor enabling sustainable governance, it is important not to completely sacrifice leadership for inclusivity (Belle, 2016). Challenges regarding participatory governance are mostly related to keeping a balance between inclusivity and efficiency (Petschow, Rosenau, & Weizsacker, 2017). Indeed, inclusivity would require organizations to elaborate which and how stakeholders participate depending on the reasons for initiating the participatory procedure. Thus, corporations should start by elaborating inclusivity procedures for common decision or events and decide which business units need to participate in which context and to what extent to maximize both efficiency and inclusivity.

3.2.2 Risk-based due diligence

Risk-based due diligence is defined as the process by which an organization determines the level of due diligence necessary based on the business partner's level of risk (TRACE, 2018a). Third parties include sales agents, lobbyist, business development, consultants, custom or visa agent, joint-venture and consortium partners, and many more.

3.2.2.1 Third-Party Risk Management

Third parties are necessary in today's business world. Indeed, companies need to team up to be competitive and win major projects. These partnerships bring many external risks which are complicated to manage for companies. Six steps are suggested for an effective third-party risk management program (Ernst & Young, 2018):

1. Establish a governance structure to set the tone from the top,
2. Establish the scope of third parties for your organization,

3. Establish risk models according to the organization's risk aversion,
4. Establish the internal regulatory framework around third party's partnership and risk management of the organization,
5. Execute the process,
6. Improve the process constantly with reports, technology and research.

Companies need to periodically review and improve their process, especially for the risk models since data, regulatory framework and geopolitical situation are constantly evolving. Three steps usually compose the risk model process (Martin Loosemore, 2006):

Risk identification is the first step in risk modeling. The first key success factor (KSF) is the combination of many different analyses (Gudienė et al., 2014). Past projects, interactions between company stakeholders and activity breakdown are all part of this KSF (Liu et al., 2016). The second KSF is to identify which risk belongs to whom. The accountability is divided and provides a better understanding of the project (Iqbal, 2015). Risks need to be properly identified before making a decision. To do so, one must identify objectives and performance indicators (Martin Loosemore, 2006). While identifying hundreds of risks could impress some, it is recommend to have a shorter list of risk to avoid excessive administrative workload (Fraser & Simkins, 2016).

Risk assessment is the second step in risk modeling. To include uninsurable risks, a comprehensive approach is necessary. The first KSF is to include intuition, professional experience, and personal judgment (Taroun, 2014). Indeed, through an individual interview or survey, experts can share information that they would not be comfortable sharing in a group (Fraser & Simkins, 2016). The second KSF, related to the emergence of sustainability issues, is the use of analytic methods to add environmental and social criteria to the usual ones (Drennan, 2004; O.C. Ferrell, 2015). Third party risk assessment often covers more than one risk. Organization can assess the overall third party or each risk separately (Tableau 3.1) (NAVEX Gobal, 2018).

Tableau 3.1 Risk assessment overall and precise format comparison

Overall Risk Assessment	**Precise Risk Assessment**
Overall risk evaluation (one risk level)	Risk evaluation for each risk (one level/risk)
• Only one approval process • Originator of the relation has limited understanding of the result of the risk assessment • Harder to determine if a business partner needs to go through the process for a second project with the same company (less information)	• One approval process/risk (if levels are different) • Precise information on the risk assessment for the originator • Easier to analyze partner for a second project

Risk mitigation is the third step in risk management. The first KSF is to choose the appropriate response to the risk. Possible actions include avoiding/eliminating, transferring, reducing, exploiting (positive), sharing or accepting the risk (Mhetre, 2016). Another KSF is to evaluate the risk management performance of the company properly by carrying internal audits regularly (El-Sayegh, 2014). For third-party risk management, organization carries due diligence before choosing the response to the risk. Due diligence allows it to dig deeper according to the potential partner's risk assessment.

3.2.2.2 Risk-based approach

The level of scrutiny necessary to be confident that a company is engaged in legitimate partnership varies with partner's risk (PACI, 2013). The level of partner's risk therefore determines the scope of the due diligence and how deep one should dig. The risk-based due diligence process is shown in figure 3.1.

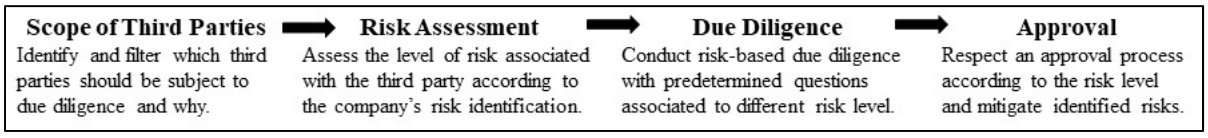

Figure 3.1 Risk-based approach for due diligence

Key risk indicators for integrity risk assessment are the geographic location, the type of industry, the partner profile, the proximity with public officials, the type of relation , the type of remuneration and the type/complexity of contract (Dow Jones Risk & Compliance, 2018; NAVEX Gobal, 2018; PACI, 2013). The evaluation of these indicators determine the appropriated risk level, and therefore, the level of scrutiny necessary. Having a well-balanced and safe risk assessment process is necessary to make the due diligence program manageable and effective (PACI, 2013).

3.2.2.3 Due Diligence

Corporate governance and due diligence are two important concepts in the actual business world. Indeed, both have evolved and now circumscribe not only economic behavior, but also social and environmental aspects. Thus far, many still argue on the definition and the actual scope of the due diligence. Due is defined as payable or immediately enforceable, whereas diligence is attention, care and application (Spedding, 2009). The United States Securities Act of 1933 is seen as the origin of the due diligence by many (Taylor, 2009). It provided defense for broker-dealers and protected them against legal liability. The due diligence process is composed of an investigation of facts and an evaluation of the findings by the designated, responsible person. Entities may be liable for negligence if insufficient or inadequate resources are assigned to the due diligence process. According to a survey, advanced programs for third-party risk management apply risk-based due diligence (NAVEX Gobal, 2018). Due diligence processes can be precise or general (Tableau 3.2), but according to the same survey, advanced programs tend to combine different approaches for risk-based due diligence. Laws and procedures regulate and shape due diligence programs.

Tableau 3.2 Due diligence formats

Overall Due Diligence	**Precise Due Diligence**
Set of due diligence questions according to the global level assessment	Due diligence questions based on the specific answers
• More questions covering all the risks • More information, second barrier if the process is poorly done • Same information required for all business partners	• Fewer questions only covering higher risks • Only information about medium or high-level risks • Precise questions help dig deeper for higher risks

3.2.3 Laws and procedures

Laws and procedures foster due diligence programs for companies. Besides protecting companies from poor decisions making, due diligence programs are also required in many legislations. The failure to implement adequate due diligence to prevent related ethical misconduct can be considered as corporate criminal liability. Under the UK Bribery Act, strict penalties for active and passive bribery by individuals as well as companies are included. The failure of commercial organizations to prevent bribery is an offense of strict and vicarious liability (United Kingdom, 2010). This means that the defendant is legally responsible for the consequences of an activity even in absence of criminal intent and responsible for the acts of his subordinate. Another incentive is the reduction of fines and sentences if a guilty company has an effective compliance and ethics program and conducts due diligence (United States Sentencing Commission, 2018). In the same vein, international funding institutions also require effective due diligence measures to end a sanction or debarment after misconduct (The World Bank, 2010). The previous laws and procedures were closely related to economic/financial due diligence. Human rights due diligence is addressed, amongst others, by the United Nations in their document to implement the “Protect, Respect and Remedy’’ framework (United Nations, 2011).

3.2.4 Integrity-Related Due Diligence

These laws, procedures and risk indicators mentioned above contain information for economic/financial and social/human rights due diligence. According to manager or company's preferences, each risk indicator is graded, or an overall risk evaluation is done. Usually, the investigation for low-risk third parties takes place within the company's department who requested that partnership and consists in investigations and internal questionnaire. By contrast, medium or high-risk third parties usually require supervision from the legal or compliance department and an external questionnaire to the potential partner (PACI, 2013).

3.2.4.1 Economic Due Diligence

Recently, many organizations established standards and procedures for economic due diligence. Economic topics related to integrity include corruption and bribery, collusion and antitrust, conflict of interest, and compliance with tax laws and sanctions. The three steps for a third-party economic due diligence are listed (NAVEX Gobal, 2018; PACI, 2013).

- Data collection: information about the organization, its ownership and operations, its reputation and capacity to counter integrity-related risks, and the contract terms and suitability of the business partner;
- Verification and validation of data: should involve an independent business function (legal or compliance) for medium or high-risk. The responsible should look for gaps or anomalies and ask for clarification if necessary;
- Evaluation of results: information collected should be reviewed against red flags which indicate a higher risk. Also, if the information reflects a complete picture of the actual situation.

Once the due diligence process is completed, an effective approval system is the last barrier for integrity. It is a pivot point that determines whether to accept, modify or refuse the relation. It is recommended to have at least two departments involved for medium or high-risk (PACI,

2013). Finally, post-approval measures, such as specific contractual language, training of third parties and ongoing monitoring, are suggested to protect companies.

3.2.4.2 Social Due Diligence

The process for social and economic due diligences are the same since it is about protecting integrity and not about profitability or other classical business risks. Social topics related to integrity include human rights and working conditions. Human rights risks can be defined as potential or actual harm to people in violation to internationally proclaimed laws (Taylor, 2009). Interestingly, financial crimes are closely connected to human rights. Indeed, they are a significant obstacle to the human rights improvement in developing countries (Hess, 2018). Often corruption ends up being paid by the poor, and this realization led to the massive anti-corruption movement. Since many countries have unstable political and socioeconomic conditions, corporate accountability is seen as a solution to prevent labor abuses and others (Rodríguez, Montiel, & Ozuna, 2014). The Guiding Principles on Business and Human Rights specify at principle 13 that business has the responsibility to (Bonnitcha & McCorquodale, 2017):

- Avoid causing or contributing to adverse human rights impacts through their own activities, and address such impacts when they occur;
- Seek to prevent or mitigate adverse human rights impacts that are directly linked to their operations, products or services by their business relations, even if they have not contributed to those impacts.

Also, the United Nations established ten principles for a more inclusive economy through responsible business practices (Hemphill & Lillevik, 2011). A survey revealed that contractual terms and codes of conduct are the two most widely used methods to address human rights in different industries (McCorquodale et al., 2017). Indeed, in an engagement with a third party, contractual provisions act as warranties and leverage in case of misconduct. Another method is external inspections and training carried out in the partnership.

Clicours.COM

3.2.5 References for Third-Party Risk-Based Due Diligence

Being socially responsible is now mandatory for companies. Many organizations were since created to provide service about how to conduct business ethically and control third parties. They produce annual reports that share insights and tips on third-party risk-based due diligence and data for the different risk indicators. The content of these reports originates mostly from data produced by non-governmental organization. They act as references for risk assessment and due diligence (Tableau 3.3).

Tableau 3.3 References documents for integrity risk assessment and due diligence from international organizations

Organization	Document title	Description	Key elements
Business & Human Rights Resource Center	Database (Business & Human Rights Resource Centre, 2018)	Search engine providing information about business & human rights	Range by companies or by topics relating to human rights
CATO Institute	Human Freedom Index 2018 (Porcnik, 2018)	Index and rating for each country with a description	The index measures the personal and economic freedom of individuals to provide a human freedom score
Global Slavery Index	Modern slavery: a hidden, everyday problem (Global Slavery Index, 2018)	Findings and scores by country	Prevalence, vulnerability and government response to modern slavery are considered. Importing risk for the G20 countries are listed.
Human Rights Watch	World Report 2018 (Human Rights Watch, 2018)	Events report by country	2018 report focuses on authoritarian populist governments
Tax Justice Network (TJN)	Financial Secrecy Index (Tax Justice Network, 2018)	Identifying the most important providers of international financial secrecy	20 different secrecy indicators are used to rank the different countries
TRACE Matrix	TRACE Bribery risk Matrix (TRACE, 2018b)	Score per country about corruption and bribery risk	Based on four domains: opportunity, deterrence, transparency and oversight
Transparency International	Transparency International Corruption perception Index (TICPI) (Global coalition against corruption, 2018)	Annual data about corruption and ratings by country	Based on four elements: Freedom of speech, of the press and of assembly, and civil participation.

3.2.6 Applicability to construction engineering industry

Many organizations propose third-party management solutions. Companies need to purchase the models and, in some cases, adapt them to their reality. These solutions are, for the most part, designed and proposed by accountant and broker companies specialized in financial activities (Dow Jones Risk & Compliance, 2018; Ernst & Young, 2018; NAVEX Gobal, 2018). Few studies addressed the adaptation of these solutions to construction and engineering companies. Also, some organizations provide prescriptive models for specific risks like corruption and bribery (Ethisphere, 2018; TRACE, 2018a), but do not address all integrity-related risks under one model. Construction and engineering companies conduct an impressive number of partnerships annually and many questions remain unanswered regarding third-party risk management in the scientific literature.

- How these models can be adapted to construction and engineering reality?
- How and what to modify in the content from the different prescriptive models?
- How can construction and engineering companies improve their third-party management process and withstand the test of time?

The next section proposes and advances a methodology for a risk-based due diligence program for construction and engineering companies based on a case study at SNC-Lavalin.

3.3 Proposed methodology for risk-based due diligence through a case study in a major construction engineering company

The proposed methodology will enable the design of a third-party risk-based due diligence tool for construction engineering companies. For the purpose of this study, content for the tool will be proposed. The steps, content and format have been determined following literature and references review, and an internal survey previously conducted at SNC-Lavalin's Integrity department. Past corruption-related misconducts led to a complete change in the company's ethic culture. Since then, SNC-Lavalin is an innovation-driven organization in ethics and compliance, and it decided to sponsor this research for the continuous improvement of their business partner compliance tool. To fully understand the case studied, the measures to

implement an ethical culture used by SNC-Lavalin are discussed. Then, the six proposed steps to build third-party risk management process proposed in the literature are described according to SNC-Lavalin's actual process. Starting with the leadership challenges, SNC-Lavalin used all the seven mechanisms to establish an ethical climate.

1. Integrity was added as one of their four values.
2. The company awarded the Compliance Leader Verification from Ethisphere Institute an independent center for research, best practices and thought leadership. SNC-Lavalin's CEO is also co-chair of the Partnering Against Corruption Initiative (PACI);
3. Publication of a code of conduct and ethics annually.
4. An ethics and compliance hotline operated by an independent third-party service provider was implemented.
5. Integrity awards are periodically offered to employees displaying an outstanding ethical conduct.
6. Within their training and documents, SNC-Lavalin represents its great diversity by using images or examples with people from different gender, age or race (statistically equal). It also uses a fictive country name not to reinforce any stereotypes.
7. According to their tasks, employees must follow many training regarding money laundering, facilitation payments, corruption, bribery, and other ethical issues.

For the organizational structure, 10 out of the 11 members of the board are outsiders of the company. The CEO is the only insider and does not have the chairman's role. Participatory governance is also frequently used. As an example, the Policy Oversight Committee (POC) is a group composed by employees from all corporate functions who proposes and revises governance documents, politics, procedures, statements and others. Also, considering the employees' answers to the survey to improve their business partner compliance tool is a form of participatory governance. Part of establishing an ethical climate is to protect it. Indeed, even if internally the company proceeded to a complete change of culture, it still faces the same external threats mainly coming from business partners and suppliers. To preserve that culture, SNC-Lavalin must manage these risks. Following is the six proposed steps for third-party risk management process according to SNC-Lavalin.

1. Establish a governance structure to set the tone from the top: The Integrity department is responsible for the code of ethics and business conduct, the integrity-related risks' management and the internal investigations. They also manage the business partner compliance process and tool.
2. Establish the scope of third parties for your organization: At SNC-Lavalin, business partners are defined as any third party who acts on behalf of or is partnered with SNC-Lavalin for the purpose of undertaking a specific task.
3. Establish risk models according to your organization's risk aversion: SNC-Lavalin uses a tool for business partner compliance, which it established in 2014 and which covers integrity-related risks like corruption, bribery, antitrust and compliance. It is an adapted prescriptive model from a third-party management consultant firm.
4. Establish the internal regulatory framework around third party's partnership and risk management of your organization: SNC-Lavalin established its own regulatory framework for the business partner compliance process with Standard Operating Procedures (SOP) which cover levels of approval, business partners rehabilitation programs, and others.
5. Execute the process: SNC-Lavalin has assessed thousands of business partners since 2014.
6. Improve the process constantly with reports, technology and research: Recent audits suggested possible improvements for the business partners' monitoring.

he methodology focuses on improvement of the risk model. Data and technologies constantly evolve and the risk model is subject to periodical changes. The figures 3.2 and 3.3 show the process and where this research stands.

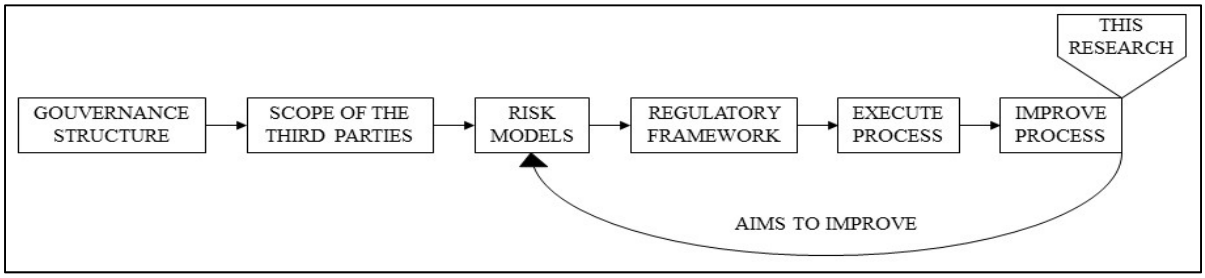

Figure 3.2 Six steps for third party risk management

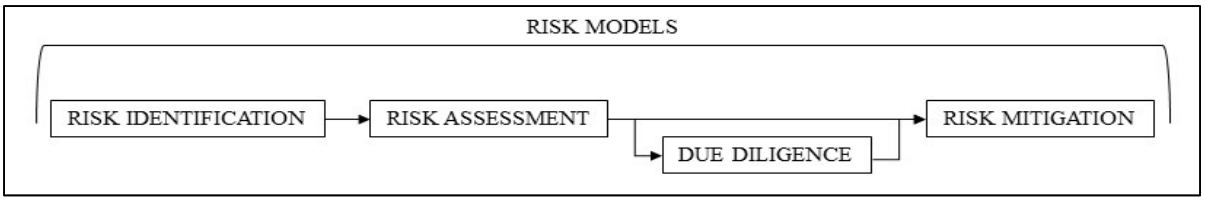

Figure 3.3 Four steps for risk model design

3.3.1 Risk model

The risk identification and assessment, and the due diligence will be covered by this research. For the format of the risk assessment and due diligence, as mentioned, it is suggested that advanced programs tend to combine different approaches. Therefore, it is suggest having an hybrid version of the risk assessment and due diligence format (Tableau 3.4).

Tableau 3.4 Hybrid format for risk assessment and due diligence

Hybrid Risk Assessment	**Hybrid Due Diligence**
A combination of the overall and precise due risk assessment	A combination of the overall and precise due diligence format
• Only one approval process • Assessment for each risk to provide more information to the originator • Overall assessment for the approval process • More information for the analysis and a precise due diligence	• Basic questions about social and economic themes for a second barrier • Precise questions for higher risks to dig deeper • Information for low, medium and high risk • Riskier partner leads to longer process

3.3.2 Risk identification

As mentioned, risk identification is based on SNC-Lavalin's code of ethics and business conduct (SNC-Lavalin, 2017). Five major risks associated with integrity were highlighted. Corruption & bribery, competition & antitrust, conflict of interest, human rights and compliance with regulations are the major threats for the company's integrity. Many analyses

by the integrity department led also to the actual structure of the code of ethics and business conduct. This code reflects SNC-Lavalin's objectives. For integrity, the main performance indicator would be whether the employees comply with the code or not.

3.3.3 Risk Assessment

As discussed for risk assessment, a Key Success Factor (KSF) was to include experts' experience and personal judgment. A second KSF was to include sustainability issues to risk management. An internal survey was recently conducted at SNC-Lavalin among 14 ethic and risk management experts. The respondents were asked to identify the strength and weaknesses of the actual business partner compliance process and to identify threats and positive developments in their field of expertise regarding integrity management (Roy & al., 2019b). They were also asked to score six different risk indicators according to the five integrity-related risks. This past study identified the different types of third-parties, revealed which indicators could revealed integrity-related risks and collect the perception of experts about SNC-Lavalin's current assessment process. Results revealed that the scoring for the assessment questions should draw from the survey's results and that the strategical use of data is recommended (get more details about each risk with each questions). Following this research, suggested questions per risk and the survey's score for each indicator are shown at tableaux 3.5 to 3.9. A score of 0 means that the indicator will not detect the risk and a score of 6 means it is a great indicator to detect the risk. This survey revealed experts' perception and gaps regarding sustainability issues like human rights, conflict of interest, and more. According to the survey and a past research (Roy & al., 2019b) for the content and the weighting, a complete set of question combining the five integrity-related risks is proposed for the assessment process at Annexe I. Also, scores for integrity-related risks' level and overall partner's risk level are included in figures 3.4 to 3.6. The risk indicators with a score of 3 or below and no literature linking them to the risk are not considered. The past research also highlighted the Integrity Check as one of the major strengths of the actual process. It is recommended to keep using the lists regarding Politically Exposed Persons (PEP), adverse media coverage and the watch lists

from the development banks. Also, it is suggested to add the list from the Business & human rights resource center mentioned in tableau 3.3.

Tableau 3.5 Results and content for antitrust & competition according to (Roy & al., 2019b)

Risk indicators	Scores	Literature review	Possible questions
Proximity to public officials	2.4	NA	NA
Country	2.6	NA	NA
Partner Profile	3.3	Other similar contracts or agreements with other companies or clients	Does the partner have a similar agreement with another company?
Type of Relation	5.0	The partnership could affect market competition (joint venture or consortium)	What is the purpose of the engagement?
Type of Industry	3.7	Easier to identify if companies act like a cartel for monitoring, but no industry enables it more than others	In which industry does the business partner conduct his activities?
Contract Complexity	3.6	High valued or complex contracts reduce the number of potential submissions	Please describe the project on which the business partner will be working (price, uniqueness, complexity, number of links).

Tableau 3.6 Results and content for corruption & bribery according to (Roy & al., 2019b)

Risk factors	Scores	Literature review	Possible questions
Proximity to public officials	4.9	Many interactions with a corrupt government	For this specific engagement, will the Business Partner be directly or indirectly interacting with government officials?
Country	4.7	Corruption perception index or TRACE bribery risk per country (Table 3)	List all countries where the Business Partner is expected to perform his mandate with or on behalf of SNC-Lavalin.
Partner Profile	3.1	Past misconduct related to corruption & payment terms	How is the Business Partner compensated by SNC-Lavalin (payment or other benefit)? & Integrity check
Type of Relation	3.7	Mandatory partnership and intermediaries are often involved in corruption cases	What is the purpose of the engagement?
Type of Industry	2.1	Data indicate that some industries are more likely to ask for bribes	In which industry does the business partner conduct his activities?
Contract Complexity	2.4	Project characteristics are related to corruption vulnerability	Please describe the project on which the business partner will be working (price, uniqueness, complexity, number of links).

Tableau 3.7 Results and content for human rights according to (Roy & al., 2019b)

Risk factors	Scores	Literature review	Possible questions
Proximity to public officials	1.1	NA	NA
Country	4.9	Human freedom index (CATO), world report from Human rights watch and Global Slavery Index (Table 3)	List all countries where the business partner is expected to perform his mandate with or on behalf of SNC-Lavalin
Partner Profile	3.9	Past misconduct related to human rights	Integrity Check with the business & human rights database
Type of Relation	3.1	Partner with suppliers or subcontractors	What is the purpose of the engagement?
Type of Industry	3.9	Self-regulation and lower-skill sectors are riskier	In which industry does the business partner conduct his activities?
Contract Complexity	1.9	NA	NA

Tableau 3.8 Results and content for conflict of interest according to (Roy & al., 2019b)

Risk factors	Scores	Literature review	Possible questions
Proximity to public officials	4.6	Conflict between public duty and private interest	For this specific engagement, will the Business Partner be directly or indirectly interacting with government officials?
Country	2.1	NA	NA
Partner Profile	3.4	Different role in other projects	Does the partner have a similar agreement for another SNC-Lavalin's project or company? & Integrity check
Type of Relation	5.7	Accountability and relations with other third parties	Is there an actual or apparent conflict of interest in the business partner disclosure? & What is the purpose of the engagement?
Type of Industry	2.0	NA	NA
Contract Complexity	2.7	Harder to detect if high number of other partners	Are there a lot of contractual links for this specific engagement?

Clicours.COM

Tableau 3.9 Results and content for compliance with regulations according to (Roy & al., 2019b)

Risk factors	Scores	Literature review	Possible questions
Proximity to public officials	3.0	NA	NA
Country	4.7	Sanctions per country. Financial secrecy index per country (Table 3)	List all countries where the Business Partner is expected to perform his mandate with or on behalf of SNC-Lavalin.
Partner Profile	2.9	Payment terms and blocked persons list	Has the Business Partner requested any unusual payment terms or rates such as cash only, payments to third party or to an account in a country other than either the one where the Business Partner is based or where the services will be rendered? & Integrity check
Type of Relation	3.7	Higher risk for partners who provide financial or legal services for SNC-Lavalin	What is the purpose of the engagement?
Type of Industry	3.1	Easier to identify if sanctions for specific industries, but no industry enables it more than others	In which industry does the business partner conduct his activities?
Contract complexity	3.4	Harder to manage and comply if complex	Is there a lot of contractual links for this specific engagement?

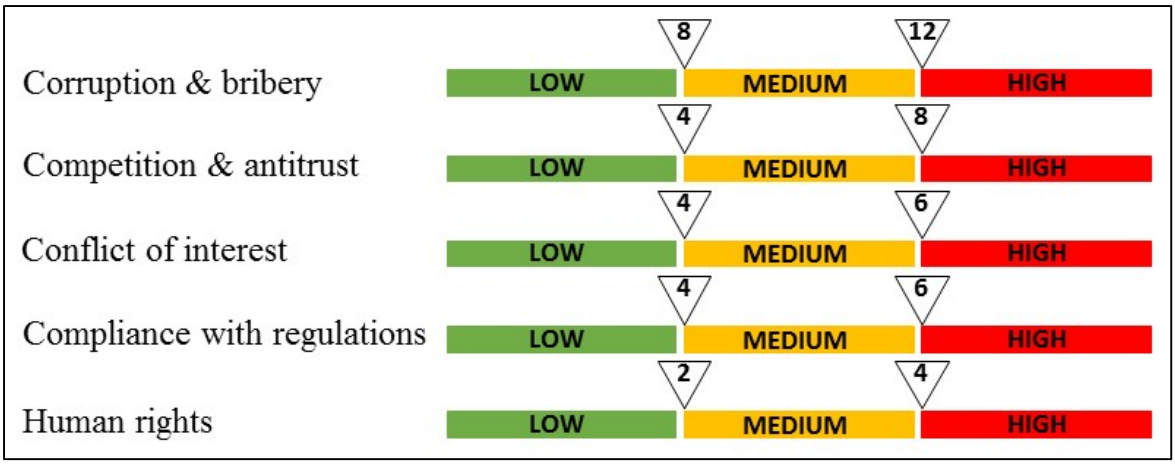

Figure 3.4 Level assessment per risk according to the sum of the scores from Annexe I

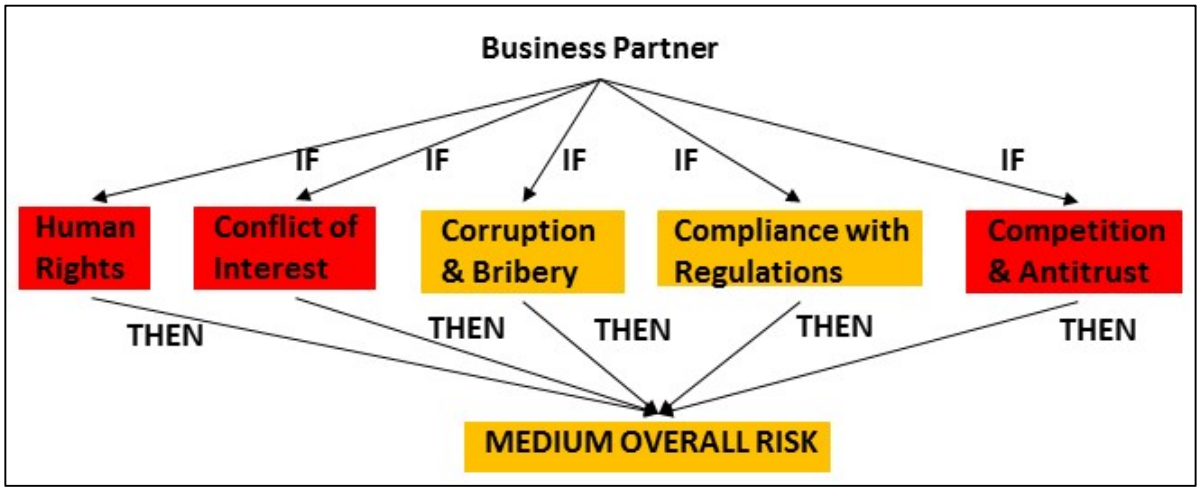

Figure 3.5 Conditions for a medium overall partner's risk-level assessment

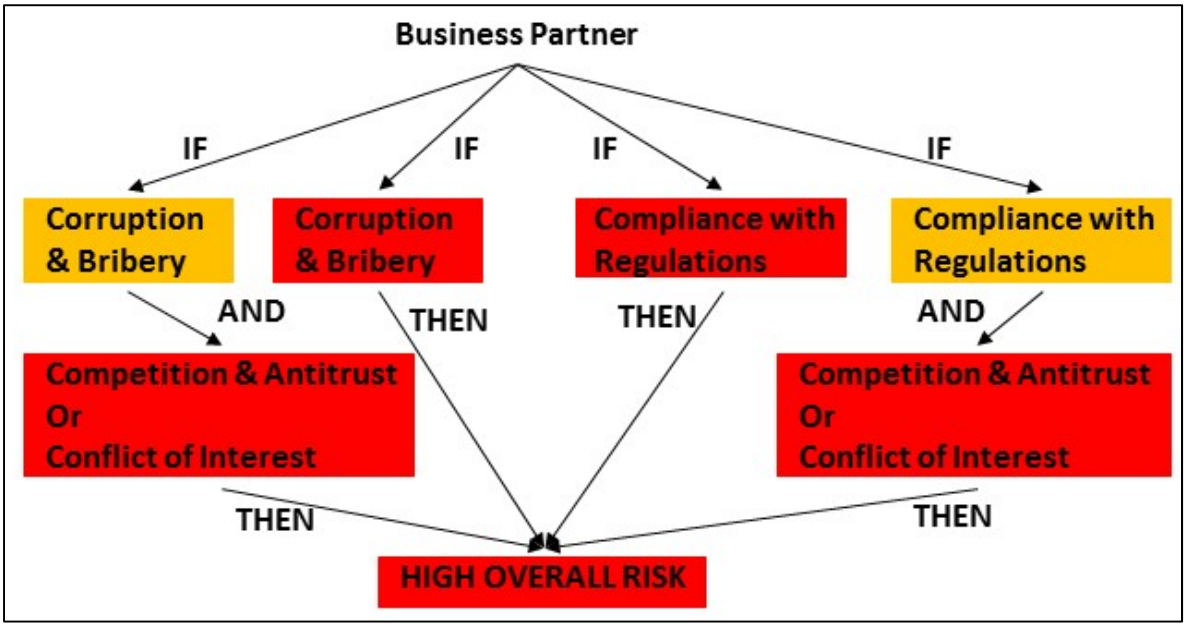

Figure 3.6 Conditions for a high overall partner's risk-level assessment

3.3.4 Due diligence

Once the business partner's level of risk is assessed, SNC-Lavalin needs to conduct due diligence. As mentioned in the literature review, three steps composed integrity-related due diligence for social and economic themes:

- Data collection: Tableaux 3.10 to 3.12 shows a series of questions about the organization, its ownership and operations, its reputation and capacity to counter integrity-related risks, the contract terms, and the suitability of the business partner. Also, using a hybrid format, a set of questions based on the answers of the risk assessment is proposed at Tableau 3.13. The content of these questions is based on the literature review and the results of a past internal survey (Roy & al., 2019b).

Tableau 3.10 Due diligence questions for low, medium and high-risk partners

Level	Due diligence questions	Risks covered
Questions for low or higher	Please give a detailed description of the actions, tasks and services the business partner will perform. In addition, please explain why the business partner has been selected and why the services cannot be provided by SNC-Lavalin.	General information
	Are the services that the business partner will perform consistent with its normal operations and previous experience?	General information
	Describe in detail the proposed compensation and all the benefits the business partner receives from SNC-Lavalin, directly or indirectly.	Corruption & bribery and compliance with regulations
	Does the business partner promised the success of a SNC-Lavalin bid or that SNC-Lavalin be granted any other benefit (license, permission, favorable business decision, etc.).	Corruption & bribery and competition & antitrust
	Has the business partner requested secrecy or anonymity for any part of the agreement?	Corruption & bribery, competition & antitrust, conflict of interest and compliance with regulations

Tableau 3.11 Due diligence questions for medium and high-risk partners

Level	Due diligence questions	Risks covered
Questions for medium or higher	Please provide the date of the establishment and the country where the business partner is incorporated.	General information and compliance with regulations
	Please provide the local authority registration document for each country where you will be performing your services.	General information and compliance with regulations
	Please provide all the key elements of the compliance program (code of ethics or business conduct, anti-corruption policy, modern slavery policy, etc.).	Corruption & bribery, competition & antitrust, conflict of interest, human rights and compliance with regulations
	Please provide the names and functions of the company's key persons and perform an integrity check against the database.	Corruption & bribery, competition & antitrust, conflict of interest, human rights and compliance with regulations
	Did the company's name change in the last 10 years? If yes, perform an integrity check.	Corruption & bribery, competition & antitrust, conflict of interest, human rights and compliance with regulations
	Will the business partner use any third parties or subcontractors to provide the services? If yes, please provide reasons and documents (supplier code of conduct and others).	Corruption & bribery, competition & antitrust, conflict of interest, human rights and compliance with regulations
	Were any key employees involved in material litigation in the past 10 years or whether there are pending litigation, judgments or government investigations against any of the key contacts?	Corruption & bribery, competition & antitrust, conflict of interest, human rights and compliance with regulations

Tableau 3.12 Due diligence questions for high-risk partners

Level	Due diligence questions	Risks covered
Questions for high	Is the business partner part of a group of companies? If yes, please provide the organizational chart.	Corruption & bribery, competition & antitrust, conflict of interest, human rights and compliance with regulations
	Please provide a written bank reference from the bank that confirms that your company is a customer in good standing.	General information and compliance with regulations
	Does the business partner have a previous or existing relation with SNC-Lavalin or one of its entities?	Competition & antitrust and conflict of interest
	Please provide the names of at least 3 business references who have retained your company for a similar purpose/work capacity.	Corruption & bribery, competition & antitrust, conflict of interest, human rights and compliance with regulations

Tableau 3.13 Due diligence based on questionnaires' answers

If originator answered	To question	Add this question to the due diligence process
Apparent or potential	1	How will the apparent/potential conflict be managed inside and outside of the partnership agreement?
Yes	3	Please provide the banking details to which the payments will be made, their latest audit and financial report, and a written reference from the bank.
A country with a prevalence higher than 5 for modern slavery	5	Provide the business partner’s modern slavery policy.
A country with a prevalence higher than 7 for modern slavery	5	Provide details on how business partner will protect human rights throughout the contract.
A country with a secrecy score above 65	5	What are the biggest country threats according to the Financial Secrecy Index?
A country with a secrecy score above 80	5	Provide details on how these threats will be managed throughout the contract.
If high number of links	6	Evaluate the business partner's third-party risk-based due diligence.
Consortium or Joint-Venture	7	Provide documents and details about the compliance and ethics program, and about the anti-corruption measures.
Joint-Venture	7	Is the contract granted from a Special Purpose Vehicle regrouping one of the Joint-Venture's company? If yes, provide details for antitrust and conflict of interest management.
Local sponsor	7	Why does SNC-Lavalin need a local sponsor (law, regulation, standard)?
Business development	7	Why does SNC-Lavalin need an agent for business development?
Lobbying	7	In which of the country specified at question 5 will the business partner interact? Does the host region or country have laws requiring lobbyists to be part of a professional association or others?
Yes	8	In which of the country specified at question 5 will the business partner interact?
Yes	9	Describe the other agreements and if it could imply a possible conflict of interest or antitrust issue.

- Verification and validation of data: As mentioned, medium and high risks should involve an independent business unit. SNC-Lavalin already has a Standard Operating Procedure (SOP) for the approval process. This process is efficient according to the survey and the literature review.
  - Low risk partners can be approved within the business unit;
  - Medium risk partners require approval from the business unit's head and a review by an integrity officer;
  - High risk partners require the approval from the sector's president, a review from the integrity officer and clearance from the chief integrity officer.
- Evaluation of results: As mentioned, if the information collected refers as circumstances suggesting a strong risk, the assessment will be modified. A few exceptions are listed below. These are subject to change and evolution and should be reviewed periodically.
  - If partner has a high risk for conflict of interest and will interact directly or indirectly with public officials, his overall risk assessment must be medium or higher;
  - If business partner is directly recommended by government in a corrupt country (score 40 or below), his overall risk assessment must be high;
  - If the business partner requested unusual payment terms in a country with a strong financial secrecy, his overall risk assessment must be high;
  - If partner conducts its activities in a country with specific sanctioned industries (e.g. oil & gas in Venezuela or Russia).

3.3.5 Risk mitigation

As mentioned, for third-party risk management, companies can accept or decline the partnership. In some case like Joint-Venture or Consortium, companies could suggest to their potential partners modifications to their management process to comply with their codes and standards. The level of approval procedure is efficient at SNC-Lavalin and reflects what is included in the literature. However, some projects will always be riskier and mitigation measures are the best way to protect the company and to pursue the projects. Mitigation measures include, but are not limited to:

clicours.com

- Specific training for the employees working with a risky partner;
- Designation of a responsible to operationalize and monitor the partner;
- Follow-up by an independent business function related to integrity or compliance.

3.4 Discussion

Integrity management is not an exact science. This research proposes a methodology for engineering and construction companies who want to comply with their code of ethics and business conduct and be more socially responsible while entering new partnerships. Being able to protect their reputation while partnering across the globe is a value-creating process for international construction companies (Petrick & Quinn, 2000). Sustainability can be define as the obligation to limit the risk of harming other individuals (Krysiak, 2009). Within this context, innovating in integrity risk management fosters ethical culture which, in turn, enables products and services innovation (Riivari & Lämsä, 2019). For the tool specifically, the content needs to be reviewed periodically. Databases are constantly evolving and are necessary for an automated process. The references mentioned in table 3 publish new content periodically and managers should subscribe to their newsletters. Global slavery, Tax Justice Network and TRACE provide useful information, tips and insights to control the risks associated with integrity. Companies conduct business in a dynamic environment leading to uncertainty and a necessity to be resilient (Slagmulder & Devoldere, 2018). It is also necessary to understand the current state of mind at SNC-Lavalin. The company is currently being prosecuted for corruption and faces new allegations in Canada (Snyder, 2019). Also, unlike many engineering companies, SNC-Lavalin also undertakes the construction phase in many projects and, in some case, even finances them in public-private partnerships. These events and facts alter company's risk aversion and exposure. Inexact science needs understanding and adjustments. To apply this methodology, it is recommended to have completed the six proposed steps for implementing an ethical culture. Third party risk based due diligence comes within this context to protect and reinforce that culture while partnering with others from the industry. Finally, it is important to have a global portrait of the company and collect the key employees' perception about the different issues the risk-based due diligence is trying to cover. This allows employees

to be part of the process and creates a sense of belonging among them which is a significant aspect of ethical leadership.

3.5 Conclusion

A methodology was proposed according to a past research and financial prescriptive models. This tool was designed to improve the company's third-party risk management. The content is adapted to a case study for SNC-Lavalin. Companies need to conduct internal data and information collection before proceeding with the methodology. Construction and engineering organizations have a lot of business partners due to the projects' unicity. Being one of the main sources for disruption in their activities, third parties must be managed properly. More laws and regulations could improve integrity management by adding risks related to environment. Regular monitoring for data from non-governmental organizations, governments and references in risk management is recommended since integrity-related risks are constantly evolving.

Further research should focus on monitoring the different partners and finding affordable and efficient ways to do it (refer to Appendice B for more information). Having a profile for each partner with its score for the five risks is a great start. This allows efficient monitoring and a more precise way to investigate the business partners. Accountability for the risk is, as mentioned, very important. Sending a second questionnaire to the SNC-Lavalin's originator after a year could be a way to empower them with the monitoring and to assure that the relation or the risks did not evolved or increased. Other studies could also focus on environmental issues related to integrity. Indeed, so far, very few environmental laws exist, and environment is often disregarded. It is often cheaper for companies to pay fines than to comply with these laws. Governments and legislators need to hold companies accountable with stricter laws. Further risk-based due diligence could then include these environmental risks.

Clicours.COM

3.6 Acknowledgments

This research was fully supported by SNC-Lavalin and Mitacs. We thank our dear colleagues from integrity department who provided great expertise to assist the research.

CHAPITRE 4

DISCUSSION DES RÉSULTATS

4.1 Hypothèses initiales et démarche de recherche

Après une analyse complète de l'outil actuel de conformité des partenaires d'affaires de SNC-Lavalin, certaines failles ont été identifiées. En effet, l'outil actuel couvre principalement les risques liés à la corruption et provient d'une firme externe qui produit des outils de gestion des risques liés à la corruption. Ces constats ont mené à la vérification de trois hypothèses implicites à la recherche.

La première hypothèse consistait à vérifier la pertinence d'inclure davantage de risques dans l'outil. La revue de littérature et le sondage ont révélé que l'intégrité n'est pas seulement définie par la lutte à la corruption. En effet, l'intégrité doit couvrir tous les risques qui sont couverts dans les codes, normes et politiques de l'entreprise. Afin de demeurer intègres et cohérentes, celles-ci doivent contrôler des risques comme l'esclavage moderne, l'évasion fiscale, le blanchiment d'argent, les sanctions économiques et autres.

La seconde hypothèse était que l'opinion des experts devait être prise en compte pour le nouvel outil. La revue de littérature et les résultats des sondages ont révélé que la perception et l'opinion des experts sont nécessaires dans la gestion de l'intégrité. Étant une science inexacte, sa gestion doit être adaptée à l'entreprise et le point de vue des experts est essentiel. Ceux-ci permettent de confirmer que les risques peuvent énormément varier selon plusieurs facteurs (géographie, secteur, etc.).

La troisième et dernière hypothèse consistait à vérifier que nous pouvions utiliser les mêmes stratégies de gestion des partenaires d'affaires que les entreprises du secteur financier. La revue de littérature et les sondages ont déterminé que ces stratégies doivent être modifiées et adaptées

aux entreprises en génie-conseil et construction. En effet, que ce soit pour la méthode d'analyse de performance (SWOT) ou les différentes étapes prescrites, des modifications sont nécessaires. Toutefois, plusieurs similitudes demeurent entre ces deux secteurs, car ces méthodes visent la conformité des partenaires d'affaires dans les deux cas.

La démarche de recherche a permis de répondre à ces trois hypothèses. Cette démarche consistait en une étude de cas en entreprise. L'étude de cas permet d'acquérir des connaissances approfondies dans une situation précise afin de tirer des méthodologies ou des bonnes pratiques. Précisément, la démarche consistait à utiliser une méthode d'analyse de performance des entreprises modifiées dans un questionnaire afin de recueillir le point de vue d'experts et d'en tirer certaines conclusions. Ces conclusions ont ensuite été utilisées afin de proposer une méthodologie et du contenu pour un nouvel outil de conformité des partenaires d'affaires chez SNC-Lavalin. La démarche s'est avérée efficace et des réponses aux hypothèses ont été trouvées.

4.2 Signification des résultats et apport à la recherche

Les résultats obtenus à la suite de cette recherche sont nombreux. Sans entrer dans le détail du contenu et du format proposés, deux résultats globaux sont soulignés.

Cette recherche a déterminé que la perception et l'opinion des experts sont essentielles dans la gestion de l'intégrité. En effet, les résultats des sondages ont démontré les différences importantes entre les différents experts et révèlent la nature inexacte de cette science. Ceci démontre l'importance d'adapter ce genre de solution selon l'entreprise, ses activités et son historique. Il est possible de relever l'importance de ce résultat lorsque l'on constate que la majorité des solutions proposées sur le marché actuellement proviennent de compagnies avec des modèles standards et normalisés. Certaines entreprises se retrouvent donc avec des outils qui gèrent des risques qui ne leur sont pas propres et oublient certains risques importants en lien avec leurs activités. Une expertise à l'interne est souhaitable afin de répondre pleinement aux besoins de l'entreprise et d'assurer une couverture solide des risques qui lui sont inhérents.

Elle a également déterminé qu'il est possible de se baser sur des modèles théoriques provenant du domaine financier. En effet, très peu de contenu scientifique propre aux entreprises de construction et génie-conseil est disponible et l'utilisation de certaines théories provenant d'autres secteurs était nécessaire. Étant donné que dans les deux cas il s'agissait d'évaluer les risques propres aux partenariats d'affaires, certaines similitudes étaient présentes. Celles-ci ont permis de faire le pont entre les deux domaines et de bien cibler quoi modifier ou conserver. Ces deux secteurs ont également vu leurs activités changer dans les dernières années en raison de la responsabilité sociale d'entreprise et les risques qui doivent être contrôlés sont similaires.

Ces résultats apportent du contenu scientifique pour les futurs chercheurs dans ce domaine. Comme mentionné, l'étude de cas a été utilisée. Pour généraliser ou développer de nouvelles théories à grande échelle, plusieurs cas sont nécessaires. Cette recherche s'inscrit comme l'une des premières à ce niveau et davantage de recherches sont nécessaires afin de soutenir les théories et les méthodologies avancées. Elle apporte également une meilleure compréhension des enjeux auxquels font face les grandes entreprises du secteur et les efforts qui sont déployés afin de les contrôler.

4.3 Limitations

Le fruit de cette recherche est une réflexion systémique qui tente de jumeler science et modèles numériques à la subjectivité de l'éthique. Les résultats obtenus ne permettent pas de tirer des conclusions solides au niveau de la pondération des indicateurs de risques en raison de la grande variabilité des réponses et de la taille de l'échantillon limitée par le nombre d'experts dans l'entreprise, même dans une compagnie de 50 000 employées. SNC-Lavalin demeure une des meilleures compagnies dans les pratiques d'intégrité avec l'obtention de sa reconnaissance par Ethisphere en 2019. Le secteur de la construction et du génie conseil doit encore améliorer ses pratiques d'intégrité pour atteindre la maturité des pratiques du domaine financier.

Ainsi, pour obtenir des réponses de sondage significatives statistiquement, il faudrait faire un sondage à l'échelle du secteur de la construction et des services de génie conseil. Grâce à la

sensibilisation du public et des gestionnaires, davantage d'expertise pourrait voir le jour dans un futur proche, permettant ainsi de grossir la taille de l'échantillon sondé. Ensuite, il faut déterminer quel organisme à la notoriété et la capacité d'organiser un tel sondage. Ces résultats pourraient être évalués par des méthodes statistiques afin de déterminer leur degré de précision au niveau de l'entreprise et du domaine. Également, la gestion des risques liés à l'intégrité doit inclure les risques internes (Manworren, Letwat, & Daily, 2016). Les actualités démontrent l'importance que peuvent avoir des fuites de données confidentielles causées par un employé malveillant. Davantage de recherches seraient nécessaires à ce niveau.

CONCLUSION

La gestion de l'intégrité dans le domaine de la construction et du génie-conseil en est à ses débuts. Les différents acteurs en sont encore à déterminer ce qui doit être contrôlé et comment. Les entreprises du domaine souhaitant mener la marche sont souvent en terrain inconnu et ce type de recherche permet d'améliorer la compréhension de l'écosystème d'affaires de la construction et les risques auxquels ces entreprises font face. En plus de proposer de bonnes pratiques générales grâce aux deux articles, cette recherche a permis d'identifier les différentes failles dans l'outil de conformité des partenaires d'affaires de SNC-Lavalin.

Dans le premier article, le point de vue des experts a permis de mieux comprendre les risques qui affectent l'entreprise et l'importance de ceux-ci. L'ajout de différents risques s'est avéré pertinent et la revue de la littérature a permis de fournir une base théorique pour les différents indicateurs qui permettront de détecter lesdits risques. Les réponses au sondage ont révélé l'importance de la participation des différents gestionnaires. En effet, les réponses étaient différentes et la perception doit être incluse lors de la gestion de l'éthique. Ces réponses ont également permis d'identifier des failles dans le processus actuel.

Dans le second article, une nouvelle méthodologie a été proposée afin de créer un outil qui permet de couvrir cinq risques liés à l'intégrité (corruption, collusion, conflit d'intérêts, conformité et droits humains). Un format hybride permet d'obtenir davantage d'information lors de l'évaluation du risque et favorisera le suivi à long terme des partenaires. Le contenu est basé sur les réponses des participants au sondage du premier article. Le poids des différentes questions est tiré de l'évaluation effectuée au premier article par les différents répondants. Les bonnes pratiques ont été identifiées et sont, pour la plupart, déjà en place chez SNC-Lavalin. L'adaptation des modèles et de la théorie provenant du secteur financier a permis de valider la compatibilité de ceux-ci avec le secteur du génie et de la construction. Les nombreuses similitudes au niveau des risques que les partenariats entraînent ont facilité ce rapprochement.

Cette recherche est une réflexion sur la gestion de l'intégrité en entreprise lors des partenariats d'affaires. Étant l'une des premières dans ce domaine, elle pourra servir de base aux futures recherches. Bien que limités par la grosseur de l'échantillon, les résultats de cette recherche permettent de mieux circonscrire ce qui doit être inclus et comment les entreprises doivent procéder afin de protéger leur intégrité avec des partenaires d'affaires dans le domaine de la construction et du génie-conseil.

Le domaine du génie-conseil et de la construction est en pleine expansion avec la population mondiale grandissante ce qui entraîne des besoins majeurs en infrastructure en plus de représenter une part importante de l'économie de tous les pays. Les projets majeurs sont souvent financés en totalité ou en partie par des fonds publics. Il est nécessaire d'assurer une gestion éthique et intègre de ces projets afin d'offrir de meilleurs services aux citoyens et de rétablir la confiance de ceux-ci envers les intervenants du génie-conseil et de la construction. Comme certaines entreprises, les gouvernements doivent également faire leur part en régulant davantage le domaine et en forçant les compagnies récalcitrantes à mettre des mesures en place pour protéger l'intégrité du secteur.

RECOMMANDATIONS

Les recommandations sont principalement en lien avec la méthodologie utilisée et les recherches futures. Elles abordent également le choix de la démarche de recherche.

Lors de cette recherche, l'outil d'analyse de performance SWOT a été modifié et utilisé. D'autres outils sont disponibles et pourraient être adaptés sous forme de sondage comme l'a été SWOT. L'utilisation de techniques comme la planification par scénario, l'analyse Politique-Économique-Technologique-Légale-Environnementale (PESTLE) et autres pourrait permettre au chercheur d'acquérir des informations pertinentes et, le cas échéant, différentes. Aussi, à la suite de la remise des réponses des sondages, certains participants ont mentionné que le rangement des différents facteurs de risque en ordre d'importance par rapport aux risques portait à confusion. Ceci pourrait être remplacé par une section qui demande aux participants de choisir, selon eux, la question sur l'indicateur de risque qui permet de mieux couvrir ledit risque. Finalement, étant donné que l'étude de cas est composée d'une seule entreprise, de futures recherches pourraient être effectuées à travers différentes firmes afin de valider les théories avancées et solidifier la méthodologie.

Pour des recherches futures, il est recommandé d'aborder la transition entre ce genre de modèle automatisé et un modèle basé sur l'intelligence artificielle et l'apprentissage machine. Cette recherche permet de proposer certaines limites qui pourraient être attribuées à l'intelligence artificielle. Ces technologies fonctionnent souvent avec des algorithmes de regroupement et il serait intéressant de voir comment ces groupes seraient déterminés et délimités et quelle serait la nature des interventions humaines au cours de cet apprentissage. Plusieurs experts affirment que la complexité et les coûts associés à l'éthique et la conformité iront en augmentant. Les entreprises doivent opter pour ce genre de solution afin d'assurer une uniformité et de laisser leurs ressources humaines s'occuper des cas uniques ou particulièrement complexes et risqués. Aussi, il est recommandé d'aborder différentes méthodes statistiques permettant d'évaluer le degré de précision des résultats numériques des indicateurs de risque par rapport à l'entreprise et au domaine dans des recherches futures.

Finalement, il est recommandé d'effectuer un sondage au sein de plusieurs entreprises afin de grossir l'échantillon étant donné le nombre d'experts très limité dans ce domaine. En effet, malgré la taille de l'entreprise étudiée, moins d'une vingtaine d'experts étaient en mesure de fournir des réponses aux différentes questions posées. De plus, sonder des experts dans différentes compagnies permettrait d'observer les différences entre les répondants liés à des éléments tels le contexte géographique, la situation financière et légale de l'entreprise, les types de services offerts ainsi que la taille des entreprises. Ces observations permettraient de mieux cerner les forces et les faiblesses, ainsi que les causes des écarts de conduite afin d'en tenir compte dans les mécanismes de gestion de l'intégrité à l'intérieur de ces entreprises. Les programmes d'intégrités seraient alors plus complets.

ANNEXE I

QUESTIONNAIRE PROPOSÉ DANS LE CHAPITRE 3

Questions	**Possible answers**	**Risks covered and scoring**				
		Conflict of interest	**Corruption & bribery**	**Compliance with regulations**	**Human rights**	**Antitrust & competition**
1. Is there an actual or apparent conflict of interest in the business partner disclosure? If yes, provide details in textbox.	If actual	Mitigate				
	If apparent or potential	6	0	0	0	0
	If none	0	0	0	0	0
2. How is the Business Partner compensated by SNC-Lavalin (payment or other benefit)? Provide details in textbox.	Major portion is fixed (hourly rate, lump sum price)	0	0	0	0	0
	Major portion depends on successful completion (commission, success fee)	0	4	0	0	0
	No compensation	0	0	0	0	0
3. Has the Business Partner requested any unusual payment terms or rates such as cash only, payments to third parties or to an account in a country other than either the one where the Business Partner is based or where the services will be rendered? If yes, provide details in textbox.	If yes	0	0	4	0	0
	If no	0	0	0	0	0

Clicours.COM

Questions	Possible answers	Risks covered and scoring				
		Conflict of interest	Corruption & bribery	Compliance with regulations	Human rights	Antitrust & competition
4. In which industry does the business partner will conduct his activities	Oil & gas	0	1	0	1	0
	Mining & metallurgy	0	2	0	2	0
	Infrastructure	0	2	0	0	0
	Nuclear	0	0	0	0	0
	Clean power	0	0	0	0	0
5. All countries where the Business Partner is expected to perform his mandate with or on behalf of SNC-Lavalin must be selected. You should also add the home base country of your Business Partner. If the mandate is in multiple countries (more than 10), you can either select all countries where the mandate will be performed or select.	If TRACE bribery risk higher than 65	0	0	0	0	0
	If TRACE bribery risk between 40 and 65	0	4	0	0	0
	If TRACE bribery risk below 39	0	6	0	0	0
	If prevalence to slavery is lower than 5 in the Global Slavery Index	0	0	0	0	0
	If prevalence to slavery is lower than 7 in the Global Slavery Index	0	0	0	1	0
	If prevalence to slavery is higher than 7 in the Global Slavery Index	0	0	0	2	0
	If secrecy score 65 or below on TJN financial secrecy index	0	0	0	0	0
	If secrecy score above 65 and below 80 on TJN financial secrecy index	0	0	1	0	0
	If secrecy score 80 or more on TJN financial secrecy index	0	0	2	0	0
	If subject to sanctions (as per company's internal documents)	0	0		0	0

Questions	Possible answers	Risks covered and scoring				
		Conflict of interest	Corruption & bribery	Compliance with regulations	Human rights	Antitrust & competition
6. Please describe the project on which the business partner will be working with the choices below. Provide details in textbox.	If higher than 500 million USD	0	1	0	0	1
	If complex/unique	0	1	0	0	1
	If low number of contractual links	0	0	0	0	0
	If medium number of contractual links	0	1	1	0	0
	If high number of contractual links	1	2	2	0	1
7. What is the purpose of the engagement? Provide details in textbox.	Business development	0	8	0	0	4
	Sales agent	2	8	0	0	0
	Consortium	0	0	0	1	4
	Joint-venture	2	0	0	1	4
	Local sponsor	0	8	0	0	0
	Custom or visa	0	1	0	0	0
	Legal or financial	0	1	1	0	0
	Lobbying	2	8	0	0	4
	Intermediary without business development	0	1	0	0	0
	None of the above	0	3	0	0	0
8. For this specific engagement, will the Business Partner be directly or indirectly interacting with government officials? If yes, provide details in textbox.	If yes	2	6	0	0	0
	If yes and directly recommended by government	4	10	0	0	0
	If no	0	0	0	0	0
9. Does the partner have a similar agreement for another SNC-Lavalin's project or company?	If yes	4	0	0	0	4
	If no	0	0	0	0	0

APPENDICE A

MODERN SLAVERY IN CONSTRUCTION ENGINEERING INDUSTRY

Vincent Roy [a] et Claudiane Ouellet-Plamondon [b]

[a,b] Département de Génie de la construction, École de Technologie Supérieure,
1100 Notre-Dame Ouest, Montréal, Québec, Canada H3C 1K3

Article présenté dans le cadre de la conférence annuelle de la Canadian Society of Civil Engineering à Laval en juin 2019

Abstract: Complex supply chains, temporary work and employment, and the extensive use of subcontracting in the construction sector create the perfect conditions for exploitation. Construction businesses have an important role in tackling modern slavery. With the new Canadian act to fight modern slavery expected to come into force in 2020, construction engineering companies must take actions to comply. Many are under the impression that slavery occurs in extreme conditions and remote locations, but it is a modern, everyday problem. This article reviews how modern slavery affects the construction industry and what companies and the industry can do to remediate this issue. Modern slavery in supply chains and construction workers are discussed according to the uncertain and shifting industry that is construction. The volume and the transparency of information as well as the lack of legislation are the main challenges that need to be solved. Some positive developments and potential solutions such as increased awareness, certification and industry self-regulation will be presented as ways to reduce the potential harm of modern slavery in the sector. Also, different technologies already used in other industries and for other functions can enable full transparency and benefit from Big Data. Blockchain, the Internet of Things and Artificial Intelligence have the potential to help companies tackle modern slavery.

INTRODUCTION

Construction is a high-risk industry (Iqbal, Choudhry, Holschemacher, Ali, & Tamošaitienė, 2015). The widespread use of agency workers and migrant labor in some country, and the constant pressure on prices have defined the sector's business models (CIOB, 2018). While these models do not lead directly to slavery, they create an environment where it is easier to exploit and for criminality to infiltrate supply chains. A single supply chain for a major contractor could consist of hundreds of subcontractors, labor agencies and material suppliers. Behind the first or second tiers of their supply chain, companies have blurred vision and verifying every transaction becomes impossible (CIOB, 2016). Labor and procurement of building materials are the two elements with a high-risk of involving modern slavery in the construction industry (Elgg, 2016). With social pressure and awareness constantly increasing, Canadian government is expected to pass a bill to tackle modern slavery in early 2020 (Canada, 2018). Within this context, Canadian construction engineering companies, especially those

working abroad and/or providing contracting services, must take actions. This short review will first present the problematic of modern slavery in the construction engineering industry. Secondly, positive developments and possible technical solutions will be addressed. Finally, a discussion about what Canadian companies should do to prepare for that bill and what is currently being done by some companies end this article.

MODERN SLAVERY IN CONSTRUCTION ENGINEERING INDUSTRY

Modern slavery constitutes a major compliance and integrity issue for companies. Indeed, there are more than 40 million modern slaves currently (Anti-slavery international, 2018). Most of them are in Asia (30 million) and Africa (9 million), but also in North America (420 000) and Europe (1,25 million) (Walk Free Foundation, 2018). Out of the 150 billion USD of illegal profits generated through modern slavery annually, 34 billion USD are made in the construction, mining and utility industries (Elgg, 2016; Institute of development studies, 2018). Modern slavery takes many forms in the construction engineering industry (Anti-slavery international, 2018; Scarpa, 2008):

- Forced labor: work or services forced against the will or under some form of threat;
- Bonded labor: people who borrow money they cannot repay and are required to pay off the debt. They often lose control over their conditions of employment and debt;
- Human trafficking: transporting, harboring or recruiting to exploit by using threats, violence and coercion;
- Descent-based slavery: people who are born in slavery because their ancestors were captured or enslaved;
- Child slavery: not to be confused with child labor, child slavery is when a child is exploited for someone else's gain.

With globalization, the products of modern slavery cross borders. It is important to assess the problem not only from the perspective of where the crime is committed but also where the products of the crime are sold and consumed (Walk Free Foundation, 2018). Countries with repressive regimes, where populations work to prop up the government and countries with conflicts resulting in the breakdown of laws, social structures and systems of protection are more prone to modern slavery. This notwithstanding, countries with high GDP are also subjected to modern slavery, particularly for migrants, homeless and minorities (Hernandez & Rudolph, 2015; UK Department of Justice, 2018). While many actions must be taken by governments, the first recommendation of the Global Slavery Index is related to businesses and states that they should prioritize human rights in decision-making and ensure they are not contributing or benefiting from modern slavery (Walk Free Foundation, 2018).

Supply chains

No other industry uses more materials by weight than the construction industry (Horvath, 2004). One of the first areas to address modern slavery is to determine where it exists in supply chains (Walk Free Foundation, 2018). Social themes have been overlooked by researchers studying sustainable supply chain (Reefke & Sundaram, 2017) and that these issues are especially problematic for developing nations (Mani, Gunasekaran, Papadopoulos, Hazen, &

Dubey, 2016). Construction engineering companies have numerous supply chains with specific features (Behera et al., 2015):

- Customers: They exercise great influence on the final product, the logistics and are numerous;
- Fragmentation: Many subcontractors, institutions and vendors involved trying to meet different and incompatible business purposes;
- Stakeholders: Network involving multiple relations and organizations with flows of information, materials, services, products and funds between clients, designers, contractors and suppliers;
- Buyer-supplier relationship: Tender price being the most significant parameter for bid evaluation (especially in the public sector) lead to conflicts, mistrust and delivery problems;
- Multiple temporary organization: Relationships focused on short-term thinking, scarred by leverage and opportunism;
- Change inertia: Construction organisations tend to be conservative;
- Make-to-order supply chain: Clients are the source of changes and this leads to conceptualization of supply chain process starting and ending with the client;
- Cyclical demand: Highly cyclical industry because the output is durable.

All these features make it even harder for construction engineering companies to tackle modern slavery. Global, outsourced and interconnected supply chains make transparency difficult (Gold, Trautrims, & Trodd, 2015). Detecting modern slavery is very challenging and may even be more difficult to detect than other social issues (New, 2015). It has been discussed that there is heterogeneity in the practices and approaches used by companies resulting in confusion among industries (Stevenson & Cole, 2018). The transparency and volume of information are the main challenges to remediate modern slavery in the supply chain.

Construction workers

Construction is a highly cyclical industry resulting in cyclical workforce demand. Construction workers are subject to economic volatility, mobility and employment insecurity (Meardi, Martín, & Riera, 2012). To adapt to that flexibility and uncertainty, some organizations see workers as disposable assets, especially the most vulnerable ones (migrants, undocumented, homeless, unskilled, etc.). In developed countries, this situation mostly occurs in the black economy (Stronger Together, 2019). According to Quebec's construction commission, 30% of construction activities in Quebec fall into black economy (CCQ, 2015). Another study estimates that construction has a 3.56% share of Germany's official economy while having a 36.36% share of their black economy (Kirchgässner, 2017). This results in a situation where vulnerable workers feel trapped. Another problem is that companies who hire such workers are often unaware of their situation. Indeed, workers are often exploited during the recruitment process by temporary-work agencies via recruitment fees, papers' confiscation, contract substitution, poor accommodation and unfair deductions (Cockbain & Brayley-Morris, 2017; Stronger Together, 2019). Migrant workers, especially new arrivals, are often seen as hard workers, loyal, reliable and prepared to work longer hours because of their lack of choice, and

the important volume of available unskilled labor intensifies competition and enables contractors to choose the ‘’best’’ migrant worker (Lewis, Dwyer, Hodkinson, & Waite, 2015). For international companies, this issue is even more common. Indeed, many cases of modern construction slaves emerged in the last years, mainly in the Arab States where the estimates of modern slavery are affected by substantial gaps in the available data (Walk Free Foundation, 2018). This region hosts more than 17 million migrant workers, many of whom are in the construction industry (95% in construction or domestic work) (International Labour Organization, 2019). Recently, many have criticized Qatar and FIFA World Cup 2022 megaproject for its abuse on migrant workers under the Kafala system (Chaudhary, 2017; Millward, 2017). The Kafala system was first introduced in many Arab States as a noble obligation in the treatment and protection of foreign guests, but is now denounced globally as a mechanism creating dependence between an employer assuming full responsibility over the employee visa and legal status (Khan & Harroff-Tavel, 2011). This sponsorship system has been denounced by NGOs, but is still in place in many Arabic states (Human Rights Watch, 2019).

Locally or internationally, construction worker abuse has many forms. Companies should assess their recruitment processes, labor sourcing and management programs, and do the same for their third party. Lack of legislation is also an important challenge for construction workers’ conditions.

POSITIVE DEVELOPMENTS

Awareness and certifications

Governments and consumers must be part of the change. Social and legal pressure will force companies to adopt more sustainable practices (B. Kim, 2017). Many NGOs raise awareness and shine a light on harmful practices. Index and annual reports help companies to assess their activities and take actions (Tableau -APA-1).

Tableau -APA-4.1 Major NGO’s raising awareness and producing data about modern slavery

Organization	Document	Description
Walk Free Foundation (Australia)	Global Slavery Index (Walk Free Foundation, 2018)	Complete index with rankings and scores per country. Prevalence, vulnerability and government response to modern slavery are evaluated.
Cato Institute (United States)	Human Freedom Index (Porcnik, 2018)	Seventy-nine distinct indicators are used to evaluate countries according to personal and economic freedom.
Anti-slavery (United Kingdom)	Various reports and case studies (Anti-slavery international, 2018)	Reports on various forms of slavery. Case studies in different countries and industries.

Independent certification such as Fair Trade (Fairtrade, 2019) labels products that were made in decent working conditions and with transparency. However, this system faced criticism by some questioning the real benefits for the vulnerable communities (Jaffee, 2015). For now, most of the labeled products are food, goods and clothing. Construction engineering would require raw materials to be certified. This notwithstanding, this kind of certification has the potential to benefit companies via positive marketing and fight slavery.

Legislation

Many organizations investigated human rights abuses in their activities to align their strategy with the United Nations Guiding principles in the past decade (United Nations, 2011). New and more restrictive legislation in the United Kingdom (United Kingdom, 2015) and California (State of California, 2010) are now forcing them to modify their business models and report annually their actions to fight slavery (Tableau -APA-2). Canada is expected to follow the trend and pass a Bill about modern slavery in 2020. France and Australia also regulate modern slavery in global supply chains.

Tableau -APA-4.2 Key legislation to tackle modern slavery

Legislation	Scope
Bill C-423 to be effective in January 2020 (Canada, 2018)	Business with activities in Canada must publish an annual statement including the organization's structure, policies, due diligence, risk and training about modern slavery. Failure to disclose will lead to a maximum fine of 250 000 CAD.
California Transparency in Supply Chains Act (State of California, 2010)	Allowing consumers to make better purchasing choices. Must disclose efforts to fight modern slavery. For retail sellers or manufacturers doing business in California with more than 100 000 000 USD in gross receipts.
Principles on Business and Human Rights (United Nations, 2011)	Provide principles to enhance standards and practices regarding business and human rights.
UK Modern Slavery Act (United Kingdom, 2015)	Business with a global turnover of 36 000 000 EUR or more with activities in the UK must publish an annual statement including the organization's structure, policies, due diligence, risk and training about modern slavery.

Self-Regulation

With complete and robust international legislation still lacking, some industries develop self-regulation mechanisms. It has been studied that self-regulation is directly related to the level of corporate social responsibility (Dashwood, 2014). Also, self-regulation level predicts companies' behavior (Nysten-Haarala et al., 2015). Information disclosure is often used as a regulatory tool to influence business behavior in many industries. Some companies outside of the construction industry voluntarily published their supplier lists. Supply chain transparency can reduce modern slavery and other social issues (Doorey, 2011).

POSSIBLE TECHNOLOGICAL SOLUTIONS

Blockchain and the Internet of Things (IoT)

Blockchain has attracted a lot of attention recently, particularly because of the growing popularity of Bitcoin. However, many argued about the independent importance of blockchain technology and claim that it is the most transformative technology since the creation of the World Wide Web (OECD, 2018). Blockchain is a decentralized technology expecting to improve trust and reduce fraud, corruption and information falsification (Chow, 2018). It has been discussed that the adoption of blockchain may bring supply chain transparency to a new level (Francisco & Swanson, 2018) and that blockchain has many favored use cases for provenance tracking (H. M. Kim & Laskowski, 2018). Assuring the strict environmental control process for transport of pharma and medical products in the supply chain (Bocek, Rodrigues, Strasser, & Stiller, 2017) and monitoring food quality along the supply chain (Feng, 2017) are some of the blockchain applications studied for the supply chain. Also, Slavefreetrade (Slavefreetrade, 2019) proposes a technology platform using blockchain to assess and certify that company's supply chains are free of modern slavery.

Internet of Things gather information about objects the environment that surround us. It generates enormous amount of data used to improve or assure efficiency in our daily lives (Gubbi et al., 2013). IoT is everywhere and creates great opportunities. Some examples of IoT technology are home automation (thermostats, lights, etc.), healthcare and fitness (smartwatch, personal emergency response systems) and smart cities (traffic congestion, pollution). IoT is also gaining popularity in supply chain management (Abdel-Basset, Manogaran, & Mohamed, 2018). Indeed, expected spending growth until 2023 in IoT is estimated at 24,2% for track-and-trace applications and at 20,2% for supply chains (Forrester, 2018). Some applications of IoT for supply chain management include real-time tracking (Ng, Scharf, Pogrebna, & Maull, 2015) and managing expiry dates for perishable goods (Heising, Claassen, & Dekker, 2017). Despite scalability issues caused by the large volume of data, blockchain and IoT could help managers identify critical points for modern slavery in their supply chain.

Artificial Intelligence (AI)

Cognitive Computing's goal is to simulate human thought processes in a computerized model (Kelly & Hamm, 2013). Starting from an algorithm, computers can learn with the help of scientists and engineers, and eventually detect patterns that humans could never detect.

Compared to human, cognitive computing does not need structure data in spreadsheets and it has been estimated that 90% of the data produced is unstructured (Deloitte, 2016b). Using AI with big data produced by IoT can greatly enhance supply chain management and reveal human rights abuse (Tjahjono, Esplugues, Ares, & Pelaez, 2017). Some applications for AI in supply chains include risk management (Baryannis, Validi, Dani, & Antoniou, 2019), logistics and schedule planification (Ivanov, Dolgui, Sokolov, Werner, & Ivanova, 2016; Li, Hou, Yu, Lu, & Yang, 2017). Despite lack of trust and decision transparency, cognitive systems could overcome some of our limitations and facilitate the process of large information volume from company's complex supply chains (Kelly & Hamm, 2013).

WHAT CAN YOU DO NOW?

With global awareness on modern slavery, many organizations published guides for businesses. Following are few suggested steps and good practice inspired by references setting the standards in this area (CIOB, 2016; Elgg, 2016; Stronger Together, 2019; Walk Free Foundation, 2018). Canadian construction engineering companies can adopt these today in anticipation of Bill C-423:

1. Commit: Assign responsibility for addressing human rights risks to a group of managers in the company. Once the scope is defined, responsible people should include clauses regarding modern slavery in policy and procedure (code of ethics, procurement, human resources, and recruitment, technical). They should communicate those changes to their third party and suppliers and ensure they have the proper resources to respect them.
2. Assess: Map the business supply chains to identify where there are risks of slavery, but also where information is lacking. Compared to data produced by NGO's (Table 1). Combine the assessed risks with the other commercial risks to define priorities and prepare an action plan to monitor those risks.
3. Implement: Use the action plan to reduce the risks of modern slavery. Engage relevant stakeholders for higher risks. Mitigate these risks at the supplier level, internally, within the industry and the government (advocate for change).
4. Remedy: Provide access to grievance mechanisms allowing workers along the supply chain and the company to be heard. Develop method and processes for victims' remediation.
5. Monitor: Track your progress and the efficiency of your due diligence efforts. Establish indicators (number of high-risk suppliers, audit raising non-compliance, compensation expenditure, number of modern slavery training) to assess your program.
6. Communicate: Share information about progress and challenges to stakeholders and others among the industry. Increased trust and cooperation will build better practices.

It is recommended to only contract with formal labor providers having legitimate business entities. Those undertaking these tasks should have been trained to recognize and prevent slavery. A legal arrangement should confirm that no recruitment fees were charged to workers. For suppliers, companies should cross-reference with multiple sources. Technologies reporting adverse media coverage and screening social media, news and others should be implemented to monitor suppliers around the globe.

Clicours.COM

Bill C-423's reporting obligation will affect construction engineering activities. Indeed, companies will have to trace all their manufactured, produced, extracted or processed goods in Canada or elsewhere along with their imported goods, and they will have to report their activities carrying risk of modern slavery and how they intend to assess and manage them. This could reveal breaches and force companies to modify or adapt their supply chains, contractual and hiring process. Reporting must also include policies, measures and training about modern slavery inside the entity. Construction engineering companies will have to provide concrete examples of those annually. They could use toolkits provide by the Chartered Institute of Building (Stronger Together, 2019). This organization also offers online training and many insights. Much of the content was created to assist companies affected by the UK Modern Slavery Act (Table 2).

Most of the Canadian construction engineering companies who already took actions to fight modern slavery have activities in the UK and other more restrictive jurisdictions (SNC-Lavalin, 2017; Stantec, 2017; WSP, 2018). Indeed, since they had to comply in 2015, most of their work is done. Ethics & compliance or Integrity departments manage the policies, measures, training and risks regarding modern slavery. These departments have amended contracts and assessment questionnaire, installed integrity/ethic hotline for employees, conducted audits and spot checks and reviewed training periodically. Usually, modern slavery risks are managed with other reputational risks (e.g. conflict of interest, corruption, collusion, etc.).

CONCLUSION

Modern slavery effects and destroys millions of lives annually. Construction engineering sector is a fertile ground for modern slavery with its complex supply chains and its volatility. Indeed, each project has numerous supply chains and companies' activities are highly cyclical resulting in various workforce and suppliers. Companies face major challenges to detect and remove slavery from their activities. This notwithstanding, many organizations raise awareness annually by publishing data and uncovering slavery stories across the globe. Very little companies have decided to take actions willingly and governments are slowly implementing legislation regarding this issue. They lead the fight and these laws are the most efficient ways to see changes in the construction sector. With the technological revolution taking place, companies could facilitate this fight and even access a competitive advantage by strategically using technologies like blockchain, IoT and AI. With Bill C-423 around the corner, Canadian construction engineering companies must be proactive and assess their activities to know the magnitude of the task awaiting them. Many guides and references were created after 2015 and the UK Modern Slavery Act to support companies. Canadian construction engineering companies should draw on their work and adapt it to their realities.

APPENDICE B

THIRD PARTY ONGOING MONITORING FOR INTEGRITY IN CONSTRUCTION ENGINEERING INDUSTRY

Vincent Roy [a] et Claudiane Ouellet-Plamondon [a]

[a] Département de Génie de la construction, École de Technologie Supérieure,
1100 Notre-Dame Ouest, Montréal, Québec, Canada H3C 1K3

Rapport interne présenté à SNC-Lavalin en juin 2019

ABSTRACT

Third party ongoing monitoring for integrity in construction engineering industry is a relatively new concept. Construction and financial sectors face the same challenges, but in a different context. Both sectors need to control the risks related to beneficial ownership, third party's evolution and fourth parties. Also, their monitoring generates many 'false positives' because of the name matching, fake news and irrelevant information. Notwithstanding these similarities, construction companies still hesitate to adopt technologies compared to the financial sector. In fact, these technologies could benefit major construction engineering companies such as SNC-Lavalin, but do not come without risks. This report presents the challenges and opportunities in ongoing monitoring, a case study for a simple algorithm implementation to reduce 'false positives' and a risk matrix about adopting such technologies to a broader scale within a construction engineering company.

INTRODUCTION

Past research regarding third-party risk management and the assessment of a business partner compliance tool used by SNC-Lavalin (Roy & al., 2019a, 2019b) determined that ongoing monitoring of third parties remains one of the biggest challenges. Indeed, the company must monitor thousands of partners in an evolving regulatory world with events related to corruption and human rights happening almost every day and sometimes implicating their business partners. Regulators of anti-corruption laws have made it clear that third parties should be subjected to some form of ongoing monitoring. The U.K. Bribery Act mentions the importance of regular monitoring at principle 6 (United Kingdom, 2010) and the Foreign Corrupt Practices Act also mention that companies should undertake ongoing monitoring and update due diligence periodically (United States of America, 1977). Ongoing monitoring is an update on the initial due diligence process and should not replace it completely. Companies need to adapt their monitoring to their reality. Indeed, the company must be able to process the information and react in reasonable delays. It has to take into account its third party's type, number and risk management resources (Huff, 2017). For companies, the actual way of doing monitoring is to cross-reference a third party against different public databases which typically include sanction, enforcement and Politically Exposed Persons (PEP) watchlists. The guides from the different Acts do not specify the frequency of the monitoring. One could think that the more the better, but not necessarily. Indeed, too much information to process could lead to mistakes

and omissions. Companies are left wondering when and what to monitor according to their activities and resources.

This internal report explains what the main challenges for SNC-Lavalin are while monitoring and includes some technological solutions that can help them overcome these issues. Finally, the implementation of one of these technologies is evaluated throughout a case study and a risk matrix presents the risks that the integrity department faces if it wants to adopt automated and technological solutions to a broader scale.

LITERATURE REVIEW

LEVEL OF SCRUTINY

Besides the overall risk assessment and the due diligence, other factors influence the scrutiny of the ongoing monitoring for specific business partners. A survey identified the lack of data as the biggest challenge for companies managing third-party risk (Thomson Reuters, 2016). A major issue is when companies work in insecure contexts, meaning that they are located in a country where data confidence is lacking (Steets, 2016). Even with a strong process and proper filters and limitations, a monitoring tool can lead to mistakes if the information collected is false or incomplete. There is a lack of data in many developing countries (United Nations, 2014). This issue leads to poor decision-making by governments and private industries. Often data is modeled or estimated instead of produced by the country. Therefore, greater scrutiny should be devoted to third parties from these countries. As an example, a Global Partnership for Sustainable Development Data was founded by international development organizations to help developing countries and aid fighting extreme poverty, climate change and ensure healthy life to all (Data4SDGs, 2019). A partnership name Open Data for Development (OD4D) publishes findings and country scores regarding the readiness, implementation and impact of open data in the country (OD4D, 2016). In our context, this resource can be used to assess if the watchlists and other sources are reliable and to determine the level of scrutiny of the monitoring team.

CHALLENGES

Complicated risks to monitor

The most complicated risks to monitor are those evolving throughout time. Indeed, conditions are evolving, and new data is necessary to properly monitor the business partners. Most risks can be easily identified and found with a simple search. As an example, a media search can reveal that a company face prosecution. However, a company engaging in a new business relationship will probably go unnoticed. What if that partnership reveals a risk regarding beneficial ownership, conflict of interest, antitrust or corruption? This section will focus on three hard-to-monitor themes; beneficial ownership, relationship and company evolution and third party’s third parties.

Beneficial ownership

Beneficial owners are people who own or control an asset and benefit from it. The concept of beneficial ownership exists because sometime a legal owner of an asset is not the person who controls or benefits from the asset (Dijk, 2018). In Canada, a beneficial owner is an individual who holds more than 25% of the company's shares or voting rights (Government of Canada, 2018). In some cases, a shareholder with fewer than 5% (even 0,01% if PEP) of the shareholding can be a beneficial owner if it can exercise control (Dun & Bradstreet, 2017; Vermeulen, 2013). Also, under the Office of Foreign Assets Control (OFAC) rule, a company is sanctioned by extension if owned over 50% by a sanctioned company or individual. All of these complicate the work of compliance management units. There are many types of ownership to look for when seeking sanctioned entities and beneficial owners (Dijk, 2018; Dun & Bradstreet, 2017) (Figures -APB-1 to -APB-4). The main challenges to assess beneficial ownership are the confusion over some definitions, the lack of ownership registries and deliberate non-cooperation (Dun & Bradstreet, 2017). Offshore centres with high financial secrecy and the complexity of corporate vehicles require compliance teams to collect data from multiple jurisdictions.

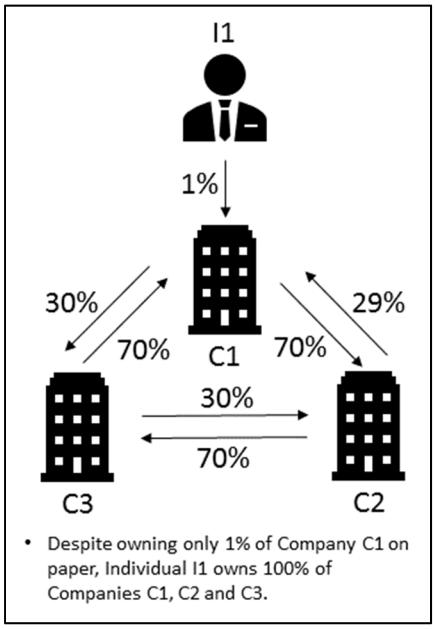

Figure -APB-1 Circular or loop ownership

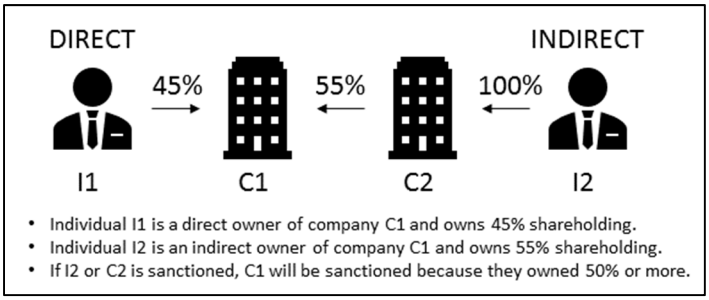

Figure -APB-2 Direct and Indirect beneficial ownership

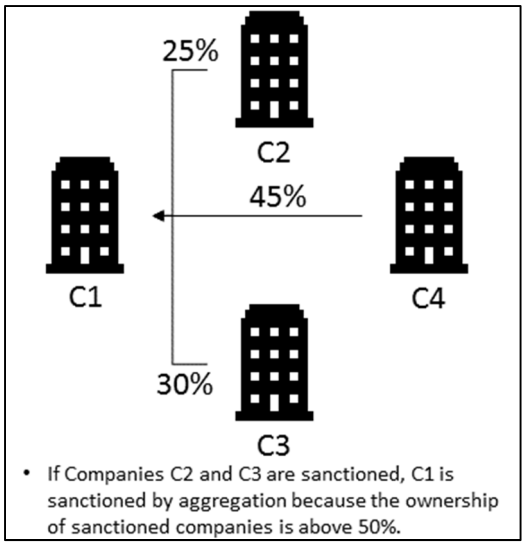

Figure -APB-3 Aggregate ownership

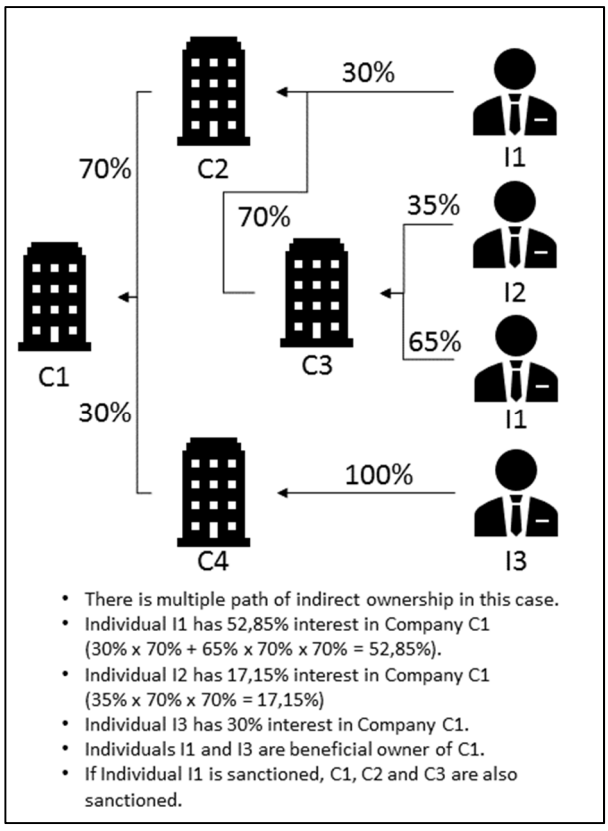

Figure -APB-4 Multiple level indirect ownership

Third party's evolution

Third party's evolution is not a risk itself, but provides context for risks like conflict of interest, antitrust and competition. Indeed, as an example, if a third party working with a company for a submission in a public procurement project gets a contract from the government to work on

a call for tender on a different but similar project (e.g. two hospitals in the same city), a potential conflict of interest is created. In this case, relying on third party's ethic and compliance program is the only protection for the company. What if the program is not mature enough or the company's risk aversion is smaller than their third party? Conflict of interest is the top ethics and compliance concern according to a survey of 394 respondents (NAVEX Gobal, 2018). Potential, apparent or actual conflict of interest can be assessed before accepting the partnership with disclosures sent to different third party's key members but is hard to monitor especially in long-term partnerships. Depending on the location and contract terms, non-compliance to antitrust laws is possible (Buxbaum, 2018).

Third party's third parties (fourth parties)

SNC-Lavalin has very few control over the fourth parties. Indeed, besides assessing the third party's compliance and ethical program, not much can be done. While doing the assessment and due diligence, the third party must provide its supplier code of conduct. This helps managers identify flaws within the partner's process. Also, the potential partners are asked if they intend to use subcontractors. Fourth parties are numerous. As an example, each project can imply many partners and each partner can have many subcontractors. This quickly goes exponentially for a company the size of SNC-Lavalin. Besides the reputational risk of a fourth party bad behaviour (corruption, collusion, human rights, etc.), the company is also directly exposed to risks such as conflict of interest or non-compliance to antitrust laws if they do not properly monitor how these fourth parties are taking part in the company's activities (KPMG, 2017).

'False positives' versus 'real positives'

Complying with all the regulations for a multinational company is a real challenge. Because of the serious sanctions following any violations of the numerous watchlists, companies prefer to be safe and implemented monitoring that generates numerous 'false positives' (Cognizant, 2014). Going through all these unwarranted red flags can distract risk management resources from real threats. Three factors for 'false positives' will be discussed: the same name, fake/unreliable sources and impertinent information.

Name matching

'False positive' name matching is the most common unwarranted alert. According to many organizations, 50% to 70% of the hits are false alerts (Cognizant, 2014). Indeed, as an example, a client with a very common name or living in Kerman, California could be blocked due to a match with the city of Kerman, Iran. There are two types of technology for name matching. Deterministic (rules-based) technology uses a combination of algorithms and rules to reveal match through unique identifiers. It is the easiest strategy for matching but also the one with the lowest degree of accuracy. This technology suits for corporations with a relatively small number of records (two million or less) (Cognizant, 2014), but still a larger number than business partners found in engineering firms. Probabilistic technology compares several information between two records and weight how they match for each value. It determines the frequency of each item (e.g. same address, name or company) and performs statistical analysis. This technology can manage foreign translations, misspellings, typing errors, synonyms,

initials, acronyms, etc. (J Lait & Randell, 2019). Fuzzy logic and phonetic matching are also probabilistic technologies. Some steps are proposed to mitigate 'false positives' without creating false negatives (Cognizant, 2014):

- Filters and data should separate names and locations from other data. For example, Marc Anthony living on Broadway Street could be matched as blocked name Anthony Broadway. The search engine should have specific case for each of these two characteristics.
- Filters should screen personal and corporate records separately. For example, Bakery Robert Limited could match Robert Baker. The search engine should allow users to tick a box if the entity is personal or vice versa.
- Determine specific screening fields having unique information. Fields such as name, country, passport numbers, taxpayer identification number are more likely to be unique. Products, services or the nature of transactions could also be specific. These fields should be added separately in the search engine.

- Exclude information such as street address, states, provinces, territories, zip codes and postal codes. As an example, a client from the city of Cuba, Illinois could be considered as a blocked entity. Zip and postal codes could match the passport or taxpayer identification number.
- Create rules for common names. As an example, the name Muhammad, Mohammed or Mohammad has been given to an estimated 150 million men and boys. For such names, the search engine should allow more importance to other characteristics.
- Monitor your records according to their risk profiles. A high-risk partner should be flagged more easily than a low-risk one in the search engine.

False name matching cannot be completely prevented but can be minimized by using the proper technology.

Fake news/unreliable sources

Fake news and unreliable sources are another important issue for ongoing monitoring automation. Indeed, these false media can generate numerous hits and force risk managers to assess sources' validity instead of focusing on assessing third-party risk. Being a buzzword recently, fake news is being widely studied and searchers from the Massachusetts Institute of Technology (MIT) are working on AI and machine learning technologies to detect fake news (Lazer et al., 2018). It has been proved that fake news spread much wider and faster than true news (Vosoughi, Roy, & Aral, 2018). Many studies tried to tackle this issue from different perspectives. Verifying the veracity of information is easier at the source and article level (Baly, Karadzhov, Alexandrov, Glass, & Nakov, 2018). At the article level, a study suggests to analyze the following characteristics (Horne, Dron, Khedr, & Adali, 2018):

- Linguistic features (quality) and the use of specific provocative or exaggerated words (e.g. demonic, hoax, conspiracy, etc.);
- A catchy headline which lures the readers to click on the link (Clickbait);
- Neutrality or emotions/sentiments expressed in the article;

- Number of shares, reactions and comments on social media. A very low number of shares indicate an unreliable source while a high number could mean both;
- Readability and identification of discrepancy and certainty;
- Moral perspective (e.g. conservatives tend to conflate morality with law-and-order or authority).

The study is based on various research modelling these characteristics for cognitive computing technology. At the source level, another study suggests analyzing the following characteristics (Baly et al., 2018):

- Wikipedia can be used as an additional source of information to predict the bias of a medium. The absence of a Wikipedia page may indicate that the source is not credible, and the content of the page may mention that the website is satirical, right-wing, etc.
- Most news media have social media accounts. The information that can be extracted from those is valuable for the analysis. Managers should check if their accounts are verified, when their accounts were created (established presence for many years for reliable media), if they have a location (fake news may want to hide it), if the URL match to their medium, the counts (established media have more friends, statuses, etc.) and the description (may contain an open declaration of partisanship).
- URL features are also commonly used to detect fraudulent users. These websites sometimes try to copy major news media by using a URL similar to a credible source. Phishing websites' URL also tend to have an excessive amount of special characters and sections. The researchers identified URL using digits, dashes or underscores as individual symbols like particularly risky. The credibility can also be detected by analyzing if the URL uses *https://* , resides on a blog platform or uses a special domain such as *.gov* for governmental websites or *.co* which is often used to copy *.com*.
- Web traffic can reveal websites that come and disappear. The use of Alexa's rank (Alexa, 2019) is recommended to analyze the keywords search traffic, the percentage of visits that consist of a single page view, similar sites by audiences and others.

While eliminating fake news and unreliable sources is an impossible task (so far), it is recommended following these practices to mitigate the risks of being misinformed.

Relevance of information

Another source of 'false positives' is irrelevant information. Indeed, as an example, if the business partner's father is being prosecuted for a corruption scandal concerning his own activities, the engine will generate a 'false positive'. Classical search engines evolved from keywords to search query that now uses Natural Language Processing (NLP) to help users find results based on their context and intent (Guo, Fan, Ai, & Croft, 2016). Since these technologies are still developing, a few questions are proposed for managers to assess the relevance of their hits:

- Does the generated hit has been published before the initial risk assessment? If yes, chances are it already has been assessed and removed.

- Does the generated hit focus directly on the monitored entity? Many hits include family members, friends and others who got caught for various reasons not relevant to the partnership.
- Does the generated hit is about the entity's business activities? As an example, a partner caught for alcohol impaired driving is not relevant.

TECHNOLOGY AND THIRD-PARTY RISK MANAGEMENT

Many has described Artificial Intelligence (AI) and Machine Learning (ML) as the fourth Industrial Revolution. AI has been existing for more than 30 years, but ML is leading the revolution. The explosion of data fosters ML and opens the door to improvement in many industries, including risk and compliance. Many predict that compliance will get more complicated and restrictive, and will, at the same time, increase costs for companies. Following is a review of different technologies enabling or complicating that revolution in ongoing monitoring.

Blockchain

Blockchain has attracted a lot of attention recently, particularly because of the growing popularity of Bitcoin. However, many argued about the independent importance of Blockchain technology and claim that it is the most transformative technology since the creation of the World Wide Web (OECD, 2018). Blockchain is one type of Distributed Ledger Technology (DLT). DLT is basically a decentralized database that eliminates the need for a central authority. A centralized database only has one point of failure making it vulnerable to cyber attacks. This technology has been studied by many to optimize customer's due diligence process for financial institutions (Parra Moyano & Ross, 2017), for biomedical and healthcare applications (Kuo, Kim, & Ohno-Machado, 2017), for governmental applications (criminal and tax records, judicial decisions, e-voting, etc.) (Ølnes, Ubacht, & Janssen, 2017) and many more. Figure 5 illustrates the basis of blockchain technology. (Olleros & Zhegu, 2016).

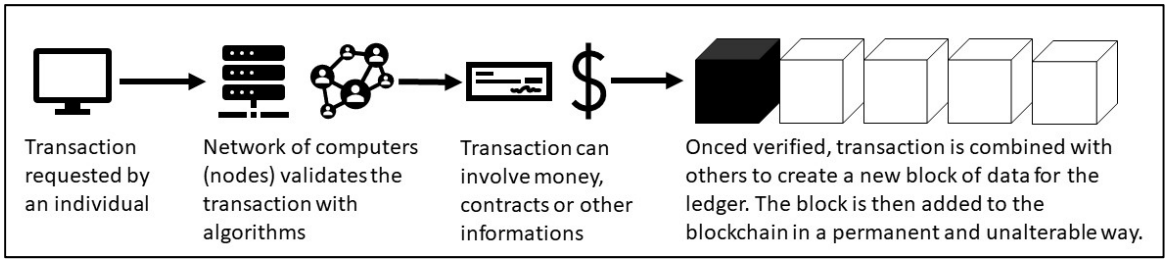

Figure B.5 Blockchain basis

Blockchain is a method to process information. There are two formats of blockchain networks (OECD, 2018):

- Public: No owner and everyone can access it freely. Everyone has access to the same copy of the ledger (number of copies same as the number of users).
- Private: Multiple owners and only permissioned users have a copy of the ledger.

Despite blockchain technology's great potential, various flaws still remain (OECD, 2018):

- Scaleability: The size of the ledger continually increasing creates a storage capacity and computing problem. Indeed, it requires a lot of energy to complete the transaction.
- Privacy: Even with cryptography and hidden identities, transaction details are fully transparent.
- Governance: Some degree of centralization is necessary to determine resolution processes in case of technological collapse or enforcement in case of a crime.

Notwithstanding these flaws, blockchain technology has great potential for risks related to beneficial ownership and fourth parties, and to reduce grand corruption.

Beneficial ownership

Corporate vehicles and other legal arrangements can be a way to introduce the disguised proceeds of crime into the financial system. Blockchain technology can prevent money laundering and facilitate Know-Your-Customer regulations' compliance. Beneficial owners can also be sanctioned entities or known for corruption or other integrity-related risks. Blockchain can significantly reduce the misuses of these arrangements and vehicles if information was reliable and easily accessible for enforcement agencies or other entities (Jong, Meyer, & Owens, 2017).

Fourth party

Complex supply chains and third party's third parties are complex to assess and monitor for companies. Indeed, globalization increased uncertainties regarding the origin of a product or the behaviour of a subcontractor. By improving supply chains and relationships transparency, blockchain can reduce harm to human rights and modern slavery while improving contractual coordination (Chow, 2018; K. Kim & Kang, 2017).

Grand corruption

Blockchain technology also has potential for public sectors and governments. Indeed, it could improve transparency and help combat fraud and grand corruption. Many states and countries issued studies about the possible benefits of blockchain in public governance. The technology can carry many traditional regulator's tasks (K. Kim & Kang, 2017). The traditional voting system could be digitalized and the blockchain would ensure that every vote is counted accurately without manipulation (Foroglou & Tsilidou, 2015). This could represent a huge step towards democracy for many developing countries. Also, many NGOs and international development organizations like the World Bank could eliminate misappropriation of funds towards a concentrated group of power or terrorist organizations, for example (Gibson Grant, Crudu, & Pilkington, 2017). Productive spending can considerably reduce poverty.

Internet of Things (IoT)

IoT gather information about objects the environment that surround us. It generates enormous amount of data used to improve or assure efficiency in our daily lives (Gubbi et al., 2013). IoT is everywhere and creates great opportunities but also challenges and threats for privacy. IoT is gaining popularity in enterprises for network-connected devices and building automation

Clicours.COM

solutions, and creating new risks associated with data breaches and cyber attack. An unsecured IoT device from a third party can have important consequences for sensitive data. A survey among more than 600 individuals participating in corporate risk governance revealed that 66% of the respondents consider that IoT significantly increases third-party risk for their organizations (Ponemon, 2018). In the same survey, respondents evaluated the likelihood of experiencing data-breach or cyber attack by third parties' unsecured IoT devices at 75% in the next 24 months. They also identified response plan, IoT identification, evaluation of privacy practices and integration of IoT security risks for on-boarding and due diligence process as steps to manage third party IoT risk.

Cognitive Computing

Cognitive Computing's goal is to simulate human thought processes in a computerized model. This technology includes, but is not limited to, artificial intelligence (machine learning, reasoning) and signal processing (speech recognition, object recognition, etc.). Massive investments enable development and improvement of these technologies that are already used by many. Speech recognition (Siri, Google Home and others), face detection and fraud detection are some of the applications of cognitive computing (Deloitte, 2016b).

Computers have always done mechanical calculations faster than humans, but with cognitive analytics they can learn. For instance, fraud detection used to be detected by analyzing a lot of structured data and when a transaction exceeds a certain amount, it would get flagged automatically resulting in many 'false positives' and negatives (Deloitte, 2016b). With cognitive analytics, if the computer detects fraud but the human determines it is not, because of some reasons, the computer will learn from it and will flag it the next time. Eventually, it will detect patterns that humans could never detect. Cognitive computing does not need structure data in a spreadsheet. Indeed, algorithms can find patterns with data from many sources that do not seem to have anything in common at first glance for humans. It has been estimated that 90% of the data produced is unstructured (Deloitte, 2016b).

Cognitive computing has great potential for risk management. Indeed, risk management is composed of unstructured data from various sources and managers need to evaluate the risks according to their experience, perception and knowledge. Cognitive systems can overcome some of our limitations (Kelly & Hamm, 2013):

- Complexity: Processing large amounts of information and understanding the interactions among them. For instance, companies can monitor social media during third party's risk assessment and spot patterns of words indicating potential risks.
- Expertise: Having a complete portrait will help make better decisions. For instance, companies could predict when and where risks are likely to happen by combining information about the event, partner profile and business activities.
- Objectivity: Eliminate the biases based on our personal experience, professional background and the influence of group dynamics. Homogenization and standardization are important while assessing risks.

- Imagination: Different settings and choices are often impossible because our background and training do not foster us to explore new or contrarian ideas. For instance, this would be particularly useful when risk managers work with scenarios.

Compliance will get more restrictive and expensive. Companies will need more human resources to manage risks. Artificial Intelligence (AI) can enable a safer and faster way to assess and mitigate risks, but this does not come without any threats or challenges.

Threats and Challenges

Notwithstanding their great potential, cognitive computing technologies present many risks themselves. Indeed, some of the main risks with AI adoption include (Boillet, 2018):

- Algorithmic bias: If the identified existing patterns reflect bias, the algorithms are likely to amplify it and reinforce discrimination. For instance, past data stating that the past third parties were all white males above 45 years old can create bias in an algorithm and disadvantage other genders and non-white people.
- Programmatic errors and overestimating AI capabilities: Algorithms can deliver wrong results leading to consequences. AI systems are as good as the data they work with (poor data=poor system).
- Legal and reputational risks: AI systems using data may not comply with data privacy regulations (EU's general data protection regulation). Handling large amount of sensitive data to make decision about individual is risky in case of an error, a cyber-attack or unethical use of it.
- Evolving regulations: Overtraining AI on past events and data presents a risk of not being able to perform in a shifting regulatory world. Regulations are evolving daily across the globe.
- Traceability and auditability: The capacity of AI to make decision outside clear and predefined rules makes it challenging to understand the decision process and, if so, highlight where something went wrong.

Adopting artificial intelligence

Various elements need to be considered for companies adopting cognitive computing technologies like AI. A research suggests steps for the implementation of AI (Chartis, 2018):

- Problem definition: Organizations must define and know the scale and the scope of a problem before using AI. Also, they must define what is the question they want to answer and what are the possible answers to benchmark and test the tool.
- Statistical formalism: Organizations must test and discuss their model. The goal is to accurately assess the uncertainty of a model's predictions. It is important since it influences governance and learning processes of the model.
- Documentation: Organizations must create frameworks and data that can be analyzed. This will ensure control within the organization.

Due to lack of transparency, many organizations need to build trust in AI. A report suggests key dimensions to build trust in AI (Craig & Gregory, 2018):

- Strong governance: Control over the design and development of AI is necessary for a safe and effective use.

- Objectives and success criteria: Assessing the performance and impact of the AI solution will help understand it.
- Transparent design: Balance between the benefits of performance and the loss of reasoning and transparency.
- Collaboration: Foster wider adoption with collaborative efforts.
- Assess data quality: Implement data management controls to assess and monitor it during the operation.
- Testing and validation: A greater model review leads to a more effective solution with less operational risk.
- Deploy incrementally: To avoid major disruption and build effective change, trust and constructive feedback.

Data

One of the main challenges in AI implementation is the quality of data. Indeed, as mentioned, the system is as good as the data its feeding from. No algorithm sophistication will overcome a lack of data. Within this context, companies need to first establish a plan to collect and annotate data. Data scientists rely on these to implement algorithms and train them. Starting from a relatively simple algorithm, the programs can learn from the 'false positives' and real positives with the annotations (Cognizant, 2014). As scientists annotate and tune, the program will get more precise. At some point, it will be possible to evaluate the reliability percentage of the algorithm and adjust governance according to it.

Algorithms

Once the proper data has been established, it needs to be analyzed. This process is known as data mining. Despite the numerous algorithms that exist for this task, decision tree is the simplest. It is recommended starting with traceable algorithms when implementing AI. Usually, highly accurate algorithms have poor traceability and vice versa. Despite this fact, decision trees enable non-expert to understand the knowledge learned by the tree through training since it is directly formulated into a hierarchical structure. Decision tree presents many advantages (Gupta & al., 2017):

- Process is visual and simple to understand/interpret;
- Requires little data preparation compared to other techniques;
- Can handle categorical and numerical data;
- White box model (traceable decisions).

Decision tree

The first step to design a decision tree is to determine the best attribute. It is the one with the highest information gain which is a measure that defines how well the attribute separates the data into groups. An attribute with low information gain would split the data almost evenly resulting in a situation that is not closer to a decision. To assess information gain it is necessary to define a measure called Entropy (Dai, Zhang, & Wu, 2016):

$$E(s) = \sum_{i=1}^{c} -p_i log_2 p_i \qquad \text{(APB-1)}$$

Where p_i is the probability of an element i in the data. Entropy is usually measured between 0 and 1. A score close to 1 means that the dataset is in extreme disorder (no majority). Then, to assess the information gain, it is necessary to measure the reduction of the disorder in our dataset:

$$IG\ (s, x) = E(s) - E(s|x) \quad \text{(APB-2)}$$

The entropy of *s* given *x* is subtracted from the entropy of just *s*. This calculates the reduction of uncertainty about *s* given an additional information *x*.

The major issue while working with a decision tree is overfitting. If the tree is fully grown, it may lose generalization capabilities. A good model must fit the data while accurately classify records it has never seen. To avoid overfitting in decision trees there are two approaches. The first one is to stop growing tree earlier, before it perfectly classifies the data. The second one allows overfit and then post-prune the tree. Pruning consists of removing a subtree rooted from a node and assigning it to the most common classification.

LITERATURE REVIEW CONCLUSION

Technologies discussed above offer great opportunities for the construction engineering third party's management. Indeed, they can enable automation and improve process standardization across the sector.

Blockchain technology requires change at a much higher level. Indeed, legislators and governments need to regulate and impose blockchain for it to be truly effective. At the enterprise level, those innovating in integrity management can lobby decision makers and should advocate for change.

IoT technology offers great opportunities in many areas for large corporations. Despite these advantages, IoT presents risks for third-party management. Enterprises should consider assessing their potential business partners' data management and use of IoT technologies. Data privacy is a major part of integrity management because of the important reputational effects if a leak was to happen.

AI technology has many benefits for third-party risk management. Despite the technology adoption's risks, AI will become necessary to assess the constantly growing volume of data. Studies revealed that the cost of compliance will increase, and that produced data are mostly disorganized. AI can overcome these challenges and provide a strong competitive advantage for companies leading the revolution.

CASE STUDY: TECHNOLOGY IMPLEMENTATION AT SNC-LAVALIN

This case study presents an attempt to use an algorithm to reduce 'false positives' while monitoring risks and a risk matrix for the implementation of cognitive technologies at a broader scale within SNC-Lavalin's integrity department.

Algorithm to reduce 'false positives'

SNC-Lavalin has more than 2000 business partners on board in their monitoring tool. These business partners are in the tool for two (medium or high-risk) to three (low-risk) years before being reassessed if they are still active with the company or deleted. They are scanned periodically against databases looking for adverse media coverage, politically exposed person, sanctions and various watchlists. These checks generate a substantial number of hits, many of which are false hits ('false positives'). It is roughly estimated that 9 times out of 10, the hit is a 'false positive'. The three main reasons for 'false positives' are the reliability of the source, name matching and the pertinence of the actual article or information according to the context of the partnership. Within this context, the case study's objective is to evaluate the potential use of a simple AI algorithms to substantially decrease the number of 'false positives' by identifying unreliable sources. For our case, the decision tree will be used. Considering if the source is reliable or not will be the goal of that decision tree.

The dataset is made of five business partners (3 enterprises and 2 persons) and consists in the assessment of 28 websites that were hits according to the actual tool. The websites were assessed according to eight different criteria discussed in the literature review:

- Are there any provocative of exaggerated words in the article such as a hoax, conspiracy, monstrous, demonic and others?
- Is the general tone in the article neutral?
- Does the source have a Wikipedia page?
- If yes, does it mention any bias of affiliation?
- Does the source have a twitter account? If yes, are there more than 20k followers?
- Does the URL seem reliable (https, .com)?
- How is the traffic on the webpage according to Alexa?
- Are the hits on Alexa reliable?

The detailed results are presented in tableaux -APB-1 to -APB-5 and the average and standard deviations for the information gain are presented at table -APB-6.

Tableau -APB-1 Source assessment for person 1

PERSON 1									
Websites	**Provocative/ exaggerated words**	**Neutrality**	**Wikipedia page?**	**Does it mentions a bias or affiliation?**	**Social media account? With more than 20k followers?**	**URL with https and .com**	**Web traffic on alexa?**	**Related hits on alexa are reliable?**	**Hit or no hit?**
(Raialyoum, 2017)	No	No	No	NA	Yes	Yes	Low	No	**No**
(Ship and bunker, 2017)	No	Yes	No	NA	No	Yes	Low	No	**No**
(Alarabiya, 2017)	No	Yes	Yes	No	Yes	Yes	High	Yes	**Yes**
(Hellenic shipping, 2018)	No	Yes	No	NA	No	Yes	Low	Yes	**No**
RESULTS									
E(s1)	0,81	0,69	0,00	1,00	0,50	0,81	0,00	0,50	**Entropy**
E(s2)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	**0,81**
E(s total)	0,81	0,69	0,00	1,00	0,50	0,81	0,00	0,50	
Information gain	0,00	0,13	0,81	0,00	0,31	0,00	0,81	0,31	

Tableau -APB-2 Source assessment for enterprise 1

ENTERPRISE 1									
Websites	**Provocative/ exaggerated words**	**Neutrality**	**Wikipedia page?**	**Does it mentions a bias or affiliation?**	**Social media account? With more than 20k**	**URL with https and .com**	**Web traffic on alexa?**	**Related hits on alexa are reliable?**	**Hit or no hit?**
(The American Report, 2016)	Yes	No	No	NA	No	No	Low	No	**No**
(Daily Sabah, 2016)	No	Yes	Yes	Yes right wing bias	Yes	Yes	High	Yes	**Yes**
(NY Times, 2016)	No	Yes	Yes	Yes left wing bias	Yes	Yes	High	Yes	**Yes**
(Reuters, 2015)	No	Yes	Yes	No	Yes	Yes	High	Yes	**Yes**
(Press TV, 2016)	No	Yes	Yes	Yes and disinformation	Yes	Yes	High	Yes	**Yes**
(Family security matters, 2016)	Yes	No	Yes	Yes	No	No	Low	No	**No**
(Arabian Industry, 2019)	No	Yes	No	NA	Yes	Yes	Low	Yes	**No**
RESULTS									
E(s1)	0.52	0.00	0.52	0.65	0.52	0.52	0.00	0.52	**Entropy**
E(s2)	0.00	0.52	0.00	0.00	0.00	0.00	0.00	0.00	
E(s total)	0.52	0.52	0.52	0.65	0.52	0.52	0.00	0.52	**0.95**
Information gain	0.44	0.44	0.44	0.31	0.44	0.44	0.95	0.44	

Tableau -APB-3 Source assessment for enterprise 2

ENTERPRISE 2									
Websites	**Provocative/ exaggerated words**	**Neutrality**	**Wikipedia page?**	**Does it mentions a bias or affiliation?**	**Social media account? With more than 20k followers?**	**URL with https and .com**	**Web traffic on alexa?**	**Related hits on alexa are reliable?**	**Hit or no hit?**
(IFLR, 2013)	No	Yes	No	NA	No	Yes	Low	Yes	**Yes**
(New York State, 2018)	No	Yes	Yes	No	Yes	Yes	High	Yes	**Yes**
(Ein news, 2016)	No	Yes	No	NA	No	Yes	Low	No	**No**
(Market screener, 2019)	No	Yes	No	No	No	Yes	High	No	**No**
RESULTS									
E(s1)	1,00	1,00	0,69	1,00	0,69	1,00	0,50	0,00	**Entropy**
E(s2)	0,00	0,00	0,00	0,00	0,00	0,00	0,50	0,00	**1,00**
E(s total)	1,00	1,00	0,69	1,00	0,69	1,00	1,00	0,00	
Information gain	0,00	0,00	0,31	0,00	0,31	0,00	0,00	1,00	

clicours.com

Tableau -APB-4 Source assessment for enterprise 3

ENTERPRISE 3									
Websites	**Provocative/ exaggerated words**	**Neutrality**	**Wikipedia page?**	**Does it mentions a bias or affiliation?**	**Social media account? With more than 20k followers?**	**URL with https and .com**	**Web traffic on alexa?**	**Related hits on alexa are reliable?**	**Hit or no hit?**
(Voz, 2018)	No	Yes	Yes	Yes left	Yes	yes	Low	no	**Yes**
(El colombiano, 2017)	No	Yes	yes	No	Yes	Yes	High	Yes	**Yes**
(W radio, 2018)	No	Yes	Yes	No	Yes	No	High	yes	**Yes**
(La republica, 2018)	No	Yes	Yes	No	Yes	No	High	Yes	**Yes**
(Asogravas, 2019)	No	Yes	No	NA	No	No	Low	No	**No**
(El nuevo siglo, 2018)	No	No	Yes	Yes right	Yes	Yes	High	Yes	**Yes**
RESULTS									
E(s1)	0,66	0,60	0,00	0,54	0,00	0,46	0,33	0,33	**Entropy**
E(s2)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
E(s total)	0,66	0,60	0,00	0,54	0,00	0,46	0,33	0,33	**0,66**
Information gain	0,00	0,06	0,66	0,12	0,66	0,20	0,32	0,32	

Tableau -APB-5 Source assessment for person 2

PERSON 2									
Websites	**Provocative/ exaggerated words**	**Neutrality**	**Wikipedia page?**	**Does it mentions a bias or affiliation?**	**Social media account? With more than 20k followers?**	**URL with https and .com**	**Web traffic on alexa?**	**Related hits on alexa are reliable?**	**Hit or no hit?**
(App, 2018)	No	Yes	Yes	No	Yes	Yes	High	Yes	**No**
(Pissed consumer, 2016)	No	No	No	NA	No	Yes	High	No	**No**
(Observer, 2018)	No	Yes	Yes	No	Yes	yes	High	No	**Yes**
(Common sense for Belmar, 2012)	Yes	No	No	NA	no	no	Low	No	**no**
(Vice, 2014)	No	No	Yes	No	Yes	yes	High	Yes	**yes**
(We got the numbers, 2012)	Yes	No	No	NA	No	No	Low	No	**No**
(North Jersey, 2018)	No	Yes	Yes	No	Yes	yes	High	Yes	**Yes**
RESULTS									
E(s1)	0,69	0,46	0,46	0,81	0,46	0,69	0,69	0,39	**Entropy**
E(s2)	0,00	0,39	0,00	0,00	0,00	0,00	0,00	0,46	**0,99**
E(s total)	0,69	0,86	0,46	0,81	0,46	0,69	0,69	0,86	
Information gain	0,29	0,13	0,52	0,17	0,52	0,29	0,29	0,13	

Clicours.COM

Tableau -APB-6 Source assessment averages and standard deviations

Potential partners checked in database	Entropy	Information gain for each criteria for news reliability							
		Provocative/ exaggerated language	Neutrality	Wikipedia page	Mention of bias	Social media	URL	Web traffic	Related websites
Enterprise 1	0,95	0,44	0,44	0,44	0,31	0,44	0,44	0,95	0,44
Person 1	0,81	0,00	0,13	0,81	0,00	0,31	0,00	0,81	0,31
Enterprise 2	1,00	0,00	0,00	0,31	0,00	0,31	0,00	0,00	1,00
Enterprise 3	0,66	0,06	0,06	0,66	0,12	0,66	0,20	0,32	0,32
Person 2	0,99	0,29	0,13	0,52	0,17	0,52	0,29	0,29	0,13
Average		0,16	0,15	0,55	0,12	0,45	0,19	0,48	0,44
Standard deviation		0,20	0,17	0,19	0,12	0,15	0,19	0,40	0,33

Results analysis

The results show very few similarities when comparing the information gain between the different tested partners. A high information gain (closer to the partner's entropy value) means that the criteria reduce the disorder within our dataset and get us closer to a valid answer. The best criteria regarding information gain are constantly changing from a partner to another. Also, the standard deviations are high for all the criteria meaning that the information gains are changing drastically between each studied partner. Therefore, the decision tree does not seem to be an appropriate algorithm to detect unreliable sources and articles in this case study and with this dataset. The uncertainty is too strong and can result in mistakes and omissions which could potentially impact the company's reputation.

Discussion

Since the results are not convincing, it is recommended using another type of algorithm to assess sources and news reliability or process more data and to seek stronger tendencies. Notwithstanding this, the results do give some insights on what can detect this type of 'false positives'. Indeed, all the articles with provocative or exaggerated words are no hits, 92% of no hits do not have a social media account with more than 20k followers (twitter), 85% of no hits do not have a wikipedia page. Also, all the hits do not have provocative words and do have a wikipedia page, 93% of the hits have a social media account with more than 20k followers, 87% have a reliable URL, 87% have a high web traffic and 87% have reliable related hits. These criteria can be used within another type of algorithm or by the monitoring team while assessing the partners. Some researchers did create algorithms and technologies to detect fake news with much more complicated techniques. As an example, the Gibbs algorithm was used to estimate the truth of news and credibility of the source (Yang et al., 2019) and logistic regression and Boolean label were used to classify users reacting to news and determining if it's fake or not (Tacchini & al., 2017). These technologies are still developing. Therefore, it is important to assess the risks of such a change inside the department.

Risk matrix

Adopting cognitive technologies does not come without risks. Indeed, as mentioned, by overcoming some of our limitations, these technologies create new risks that companies are not used to manage. Therefore, it is crucial to conduct this kind of analysis before making such an investment. By comparing it to the potential benefits, decision makers can assess if the change's worth the risks. Based on different references (Deloitte, 2018a, 2018b; Hommes, 2016; Slagmulder & Devoldere, 2018), tableau -APB-7 presents the risk of adopting cognitive technologies at SNC-Lavalin.

Tableau -APB-7 Risk matrix for cognitive technologies implementation

Risk assessment to adopt cognitive technologies for SNC-Lavalin's integrity department						
Risks		**Description**	**Likeli-hood**	**Impact**	**Justification SNC-Lavalin**	**Mitigation measures**
Model (algorithm)	**Bias**	Constantly evolving datasets makes it harder to identify inherent bias in the model.	High	Medium	Dataset evolving with daily news and regulatory shift.	Identify bias like ethnicity and country. Conduct periodical analysis with statistics of the identified bias.
		Inherent bias in input data may result in unfair outcomes.	High	Medium	unreliable sources or bias/affiliated sources.	Have numerous sources providing the same information. Determine whether the source is reliable or not.
		Lack of consideration of bias by data scientists from the start.	Low	Medium	Lack of understanding of third-party risk management.	Have the assessment team or other ethic and compliance specialists team-up with the data scientists.
	Inaccuracy	Incorrect type of algorithm, poor data quality or poor parameters' choices.	Low	High	inaccurate results from the algorithm.	Develop in-house expertise and hire a specialist working within the department.
	Misuse	Misunderstanding of AI model limitations and outputs' interpretation.	Low	Low	Wanting to solve all the department problems at once.	Have a clear and (relatively) simple objective to start with. Foster collaboration between ethic and data scientists teams.

Risk assessment to adopt cognitive technologies for SNC-Lavalin's integrity department						
Risks		**Description**	**Likeli -hood**	**Impact**	**Justification SNC-Lavalin**	**Mitigation measures**
Technology	**Information/ cyber security**	Manipulation of AI black box by ill-intentioned employees.	Low	High	Ill-intentioned employees are the main internal source of risk within companies.	Contractual agreements with experts interacting with the black box
	Change management	Identifying impacts of changes in the type of dataset or other inputs.	High	Medium	Other watchlists can provide different information.	Cross reference the different watchlists and information provider to assess where data changes and why.
	IT operations	Existing legacy IT infrastructure may not be compatible with AI (e.g. legacy systems unable to process big data).	High	Low	The actual system is not fit to process such amount of data	Call for tender for a new IT infrastructure for the department after proving to the top management that few applications are already working and benefiting the company.
Regulations	**Data protection**	Data breach and privacy regulations.	Low	Medium	Data confidentiality is one of the department's roles. European Union policies on data privacy.	Have an automatic breach detection and limit the access to the minimum of people possible.
	Regulatory compliance	Traceability and auditability of decisions .	High	Medium	Someone does wrong, but was not flagged by the tool.	Start with simple algorithms to better understand the processes and be able to explain future decisions by the technology.

Risk assessment to adopt cognitive technologies for SNC-Lavalin's integrity department						
Risks		**Description**	**Likeli -hood**	**Impact**	**Justification SNC-Lavalin**	**Mitigation measures**
Organization	**Culture**	Resistance to change and lack of trust in the technology.	High	Low	The actual system works well.	Involve all the managers and employees working with the technology from the start to build trust.
	Product innovation	Investing on innovation or waiting for things to settle. Overspending on one technology can crowd out other opportunities.	Medium	Medium	The necessity to adopt technology with fewer than 2000 records	With incremental changes the investment is smaller and it is easier to stop or go back and wait for other opportunities.
	Roles and responsibilities	Clear governance of AI solutions for accountability.	High	Medium	No one is accountable or liable in case an entity is wrongly assess	Commit and assign responsibility to a manager or group of managers within the department with the appropriate expertise
	Recruitment and skills	Lack of in-house expertise and application-specific knowledge.	High	Medium	No data scientist or specialist in cognitive computing inside the department	Develop in-house expertise and hire a specialist working within the department.

Risk assessment to adopt cognitive technologies for SNC-Lavalin's integrity department						
Risks		**Description**	**Likeli hood**	**Impact**	**Justification SNC-Lavalin**	**Mitigation measures**
Service provider	**Liability**	Liability between vendors, operators and users of AI in the event of damages.	Medium	High	If a partner is assessed low but actually represents a high and has bad behaviour	Establish clear governance and separate responsibilities within the contract.

The risk matrix shows that SNC-Lavalin can mitigate and eliminate some of the risks by developing in-house expertise, within the department, to implement cognitive computing solutions. Also, incremental changes can drastically reduce SNC-Lavalin's exposure to some of those risks. Indeed, the department must adapt and learn from these changes before getting fully automated.

CONCLUSION

To conclude, third party ongoing monitoring is a complex task for organizations. Indeed, even mature companies from the financial sector acting as pioneers in integrity management still struggle to clearly identify what and how to monitor their partners. It is an even more striking reality for companies outside that sector since they are less mature in terms of ethics and compliance. Notwithstanding this, these companies can benefit from the fourth Industrial Revolution with blockchain and cognitive technologies. To deploy such drastic changes, companies must prepare and evaluate all the alternatives. The case study presented an attempt to reduce 'false positives' with a decision tree. The results showed different important criteria to consider while evaluating the reliability of a source. Also, a risk matrix presented the risks faced by SNC-Lavalin if it adopts cognitive technologies to a broader scale within the integrity department. Despite all the challenges, pioneers will win the long-term run and gain a substantial competitive advantage if they adopt and develop in-house expertise for these technologies. It will enable them to process with incremental changes and adjust their governance according to every step. With compliance expected to be more expensive, these technologies can overcome many of our actual limitations.

LISTE DE RÉFÉRENCES BIBLIOGRAPHIQUES

Abd El-Karim, M. S. B. A., Mosa El Nawawy, O. A., & Abdel-Alim, A. M. (2017). Identification and assessment of risk factors affecting construction projects. *HBRC Journal, 13*(2), 202-216. Retrieved from http://www.sciencedirect.com/science/article/pii/S168740481500036X. doi:https://doi.org/10.1016/j.hbrcj.2015.05.001

Abdel-Basset, M., Manogaran, G., & Mohamed, M. (2018). Internet of Things (IoT) and its impact on supply chain: A framework for building smart, secure and efficient systems. *Future Generation Computer Systems, 86*, 614-628. Retrieved from http://www.sciencedirect.com/science/article/pii/S0167739X1830400X. doi:https://doi.org/10.1016/j.future.2018.04.051

Abdelgawad, M., & Fayek, A. R. (2010). Risk Management in the Construction Industry Using Combined Fuzzy FMEA and Fuzzy AHP. *Journal of Construction Engineering and Management, 136*(9), 1028-1036. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29CO.1943-7862.0000210. doi:doi:10.1061/(ASCE)CO.1943-7862.0000210

Adelstein, J., & Clegg, S. (2016). Code of Ethics: A Stratified Vehicle for Compliance. *Journal of Business Ethics, 138*(1), 53-66. Retrieved from https://doi.org/10.1007/s10551-015-2581-9. doi:10.1007/s10551-015-2581-9

Al-Bahar, J. F., & Crandall, K. C. (1990). Systematic Risk Management Approach for Construction Projects. *Journal of Construction Engineering and Management, 116*(3), 533-546. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%290733-9364%281990%29116%3A3%28533%29 doi:doi:10.1061/(ASCE)0733-9364(1990)116:3(533)

Alarabiya. (2017). Retrieved from http://english.alarabiya.net/en/business/economy/2017/10/09/Oil-prices-stable-after-OPEC-signals-possible-further-action.html

Alexa. (2019). Find, reach and convert your audiance. Retrieved from https://www.alexa.com/siteinfo

Ameyaw, E. E., Pärn, E., Chan, A. P. C., Owusu-Manu, D.-G., Edwards, D. J., & Darko, A. (2017). Corrupt Practices in the Construction Industry: Survey of Ghanaian Experience. *Journal of Management in Engineering, 33*(6), 05017006. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29ME.1943-5479.0000555 doi:doi:10.1061/(ASCE)ME.1943-5479.0000555

Anderson, B. (2015). Migrant Domestic Workers: Good Workers, Poor Slaves, New Connections. *Social Politics: International Studies in Gender, State & Society, 22*(4), 636-652. Retrieved from https://doi.org/10.1093/sp/jxv040. doi:10.1093/sp/jxv040

Anti-slavery international. (2018). Slavery today. Retrieved from https://www.antislavery.org/slavery-today/modern-slavery

App. (2018). Retrieved from https://www.app.com/story/opinion/columnists/2018/11/04/oyster-creek-make-ocean-county-human-laboratory-brown/1857938002/

Arabian Industry. (2019). Retrieved from

https://www.arabianindustry.com/construction/news/2019/mar/7/dana-gas-plans-700m-kurdistan-gas-project-expansion-in-iraq-6049498/

Ashley, D. B., & Bonner, J. J. (1987). Political Risks in International Construction. *Journal of Construction Engineering and Management, 113*(3), 447-467. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%290733-9364%281987%29113%3A3%28447%29.
doi:doi:10.1061/(ASCE)0733-9364(1987)113:3(447)

Asogravas. (2019). Retrieved from http://asogravas.org/sala-de-prensa/al-dia-con-los-afiliados/puerto-vivienda-y-vias-apuesta-de-conconcreto-en-antioquia/

Badaracco, J. L., & Ellsworth, R. R. (1991). Leadership, Integrity and Conflict. *Journal of Organizational Change Management, 4*(4), 46-55. Retrieved from https://www.emeraldinsight.com/doi/abs/10.1108/EUM0000000001204. doi:doi:10.1108/EUM0000000001204

Baly, R., Karadzhov, G., Alexandrov, D., Glass, J., & Nakov, P. (2018). *Predicting Factuality of Reporting and Bias of News Media Sources*.

Bank, T. W. (2016). *Procurement under World Bank Investment Project Financing*. Retrieved from

Banque Mondiale. (2018). Gouvernance anti-corruption. Retrieved from www.worldbank.org/en/topic/governance/brief/anti-corruption

Baryannis, G., Validi, S., Dani, S., & Antoniou, G. (2019). Supply chain risk management and artificial intelligence: state of the art and future research directions. *International Journal of Production Research, 57*(7), 2179-2202. Retrieved from https://doi.org/10.1080/00207543.2018.1530476. doi:10.1080/00207543.2018.1530476

Behera, P., Mohanty, R. P., & Prakash, A. (2015). Understanding Construction Supply Chain Management. *Production Planning & Control, 26*(16), 1332-1350. Retrieved from https://doi.org/10.1080/09537287.2015.1045953. doi:10.1080/09537287.2015.1045953

Belle, S. (2016). Organizational learning? Look again. *The Learning Organization, 23*(5), 332-341. Retrieved from https://www.emeraldinsight.com/doi/abs/10.1108/TLO-01-2016-0007. doi:doi:10.1108/TLO-01-2016-0007

Bing, L., & Tiong, R. L. K. (1999). Risk Management Model for International Construction Joint Ventures. *Journal of Construction Engineering and Management, 125*(5), 377-384. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%290733-9364%281999%29125%3A5%28377%29
doi:doi:10.1061/(ASCE)0733-9364(1999)125:5(377)

Blanton, S. L., & Blanton, R. G. (2009). A Sectoral Analysis of Human Rights and FDI: Does Industry Type Matter?*. *International Studies Quarterly, 53*(2), 469-493. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-2478.2009.00542.x. doi:doi:10.1111/j.1468-2478.2009.00542.x

Bloomfield, P. (2006). The Challenging Business of Long-Term Public–Private Partnerships: Reflections on Local Experience. *Public Administration Review, 66*(3), 400-411. Retrieved from

https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1540-6210.2006.00597.x. doi:doi:10.1111/j.1540-6210.2006.00597.x

21 000 - Développement durable – Guide d'application des principes de la Loi sur le développement durable dans la gestion des entreprises et des autres organisations, (2011).

Bocek, T., Rodrigues, B. B., Strasser, T., & Stiller, B. (2017, 8-12 May 2017). *Blockchains everywhere - a use-case of blockchains in the pharma supply-chain.* Paper presented at the 2017 IFIP/IEEE Symposium on Integrated Network and Service Management (IM).

Bodet, C. (2007). La Responsabilité sociale des entreprises comme innovation institutionnelle. Une lecture régulationniste. *Revue de la régulation, 1*. Retrieved from https://journals.openedition.org/regulation/1283.

Boillet, J. (2018). AI: a risk and a way to manage risk. Retrieved from https://www.ey.com/en_gl/assurance/why-ai-is-both-a-risk-and-a-way-to-manage-risk

Bonn, I., & Fisher, J. (2005). Corporate Governance and Business Ethics: insights from the strategic planning experience*. *Corporate Governance: An International Review, 13*(6), 730-738. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-8683.2005.00466.x. doi:10.1111/j.1467-8683.2005.00466.x

Bonnitcha, J., & McCorquodale, R. (2017). The Concept of 'Due Diligence' in the UN Guiding Principles on Business and Human Rights. *European Journal of International Law, 28*(3), 899-919. Retrieved from http://dx.doi.org/10.1093/ejil/chx042. doi:10.1093/ejil/chx042

Brenkert, G. G. (2004). *Corporate integrity & accountability*: Thousand oaks.

Bu-Qammaz, A. S.-Q. S., Dikmen, I., & Birgonul, M. T. T. (2009). Risk assessment of international construction projects using the analytic network process. *Canadian Journal of Civil Engineering, 36*(7), 1170-1181. Retrieved from http://www.nrcresearchpress.com/doi/abs/10.1139/L09-061. doi:10.1139/l09-061

Bull, J. W., Jobstvogt, N., Böhnke-Henrichs, A., Mascarenhas, A., Sitas, N., Baulcomb, C., . . . Koss, R. (2016). Strengths, Weaknesses, Opportunities and Threats: A SWOT analysis of the ecosystem services framework. *Ecosystem Services, 17*, 99-111. Retrieved from http://www.sciencedirect.com/science/article/pii/S2212041615300620. doi:https://doi.org/10.1016/j.ecoser.2015.11.012

Business & Human Rights Resource Centre. (2018). Business & Human Rights Resource Centre. Retrieved from https://www.business-humanrights.org/

Buxbaum, H. L. (2018). Transnational Antitrust Law. *Oxford Handbook for Transnational Law*, 15.

Cadle, J. (2010). *Business analysis techniques - 72 essential tools for success* (BCS Ed. BCS ed.). BCS.

An Act respecting the fight against some forms of modern slavery through the imposition of certain measures and amending the customs tariff, (2018).

CCQ. (2015). *Plan Stratégique 2015-2019*. Retrieved from www.ccq.org

Chang, T., Deng, X., Hwang, B.-G., & Zhao, X. (2018). Political risk paths in international construction projects: Case study from chinese construction enterprises. *Advances in Civil Engineering*, 11. Retrieved from https://www.hindawi.com/journals/ace/2018/6939828/. doi:https://doi.org/10.1155/2018/6939828

Chartis. (2018). *Demystifying artificial intelligence in risk and compliance*. Retrieved from https://www.ibm.com/downloads/cas/DLJ28XP7

Chaudhary, V. (2017, 19/03/2017). 'We're cheated, first in India, then in Qatar': how World Cup workers are deceived. *The guardian*. Retrieved from https://www.theguardian.com/world/2017/mar/19/qatar-world-cup-workers-india-nepal-cheated-deceived

Chong, A., & Lopez-De-Silanes, F. (2015). Money Laundering and Its Regulation. *Economics & Politics, 27*(1), 78-123. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/ecpo.12051. doi:doi:10.1111/ecpo.12051

Chow, C. (2018). Blockchain for good? Improving supply chain transparency and human rights management. *Governance Directions, 70*(1), 39-40.

Cima+. (2018a). *Code of ethics and conduct*. Retrieved from http://www.cima.ca/wp-content/uploads/2018/06/180618-CIMA-code-ethics-2018-EN-FINAL.pdf

CIMA+. (2018b). *Our code of ethics and conduct*. Retrieved from http://www.cima.ca/wp-content/uploads/2018/06/180618-CIMA-code-ethics-2018-EN-FINAL.pdf

CIOB. (2016). *Tackling modern slavery in construction supply chains*. Retrieved from https://www.antislaverycommissioner.co.uk/

CIOB. (2018). *Construction and the modern slavery act*. Retrieved from https://www.ciob.org/campaigns/tackling-modern-slavery-construction

CNESST. (2016). *Plan d'action construction*. Retrieved from https://www.csst.qc.ca/prevention/secteur/construction/Pages/dangerconstruction.aspx

CNESST. (2018). Commission des normes, de l'équité, de la santé et de la sécurité du travail. Retrieved from https://www.csst.qc.ca/Pages/index.aspx

Coalition CHUs sans PPP. (2014). *Mémoire présenté par La Coalition pour des CHU sans PPP À la Commission d'enquête sur l'octroi et la gestion des contrats publics dans l'industrie de la construction* Retrieved from https://www.ceic.gouv.qc.ca/fileadmin/Fichiers_client/centre_documentaire/Les_CHUM__CUSM_et_CRCHUM_en_mode_PPP__Pourquoi_une_enquete_de_la_CEIC_est_necessaire.pdf

Cockbain, E., & Brayley-Morris, H. (2017). Human Trafficking and Labour Exploitation in the Casual Construction Industry: An Analysis of Three Major Investigations in the UK Involving Irish Traveller Offending Groups. *Policing: A Journal of Policy and Practice, 12*(2), 129-149. Retrieved from https://doi.org/10.1093/police/pax032. doi:10.1093/police/pax032

Coeckelbergh, M. (2012). Moral Responsibility, Technology, and Experiences of the Tragic: From Kierkegaard to Offshore Engineering. *Science and Engineering Ethics, 18*(1), 35-48. Retrieved from https://doi.org/10.1007/s11948-010-9233-3. doi:10.1007/s11948-010-9233-3

Cognizant. (2014). *OFAC Name Matching and False-positive reduction techniques*. Retrieved from https://www.cognizant.com/insightswhitepapers/ofac-name-matching-and-false-positive-reduction-techniques-codex1016.pdf

Cokins, G. (2013). *Strategic Business Management: From Planning to Performance*.

Collins, D. (1997). The Ethical Superiority and Inevitability of Participatory Management as an Organizational System. *Organization Science, 8*(5), 489-507. Retrieved from https://pubsonline.informs.org/doi/abs/10.1287/orsc.8.5.489. doi:10.1287/orsc.8.5.489

Common sense for Belmar. (2012). Retrieved from http://blog.commonsenseforbelmar.org/corrupt-government-agencies-part-9588267328/

Conger, J. A. (1999). Charismatic and transformational leadership in organizations: An insider's perspective on these developing streams of research. *The Leadership Quarterly, 10*(2), 145-179. Retrieved from http://www.sciencedirect.com/science/article/pii/S1048984399000120. doi:https://doi.org/10.1016/S1048-9843(99)00012-0

Conseil du trésor. (2011). *Coffre à outils pour préserver l'intégrité des contrats publics*. Québec: Gouvernement du Québec

Cooke-Davies, T. (2002). The "real" success factors on projects. *International Journal of Project Management, 20*(3), 185-190. Retrieved from http://www.sciencedirect.com/science/article/pii/S0263786301000679. doi:https://doi.org/10.1016/S0263-7863(01)00067-9

CQDE. (2018). Centre Québécois du Droit de l'Environnement. Retrieved from https://cqde.org

Craig, P., & Gregory, M. (2018). *How do you trust the machine?* Retrieved from https://www.ey.com/en_gl/what-we-think

Dai, Q.-y., Zhang, C.-p., & Wu, H. (2016). *Research of Decision Tree Classification Algorithm in Data Mining* (Vol. 9).

Daily Sabah. (2016). Retrieved from https://www.dailysabah.com/mideast/2016/10/20/iran-intensifies-crackdown-against-iranians-with-ties-to-us

Dainty, M. M. A. (2009). *Corporate Social Responsibility in the Construction Industry*. United Kingdom: Taylor & Francis.

Dashwood, H. S. (2014). Sustainable Development and Industry Self-Regulation:Developments in the Global Mining Sector. *Business & Society, 53*(4), 551-582. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/0007650313475997. doi:10.1177/0007650313475997

Data4SDGs. (2019). Global Partnership for Sustainable Development Data. Retrieved from www.data4sdgs.org

Davis, M. (2015). Conflict of Interest. In *Wiley Encyclopedia of Management*.

Deloitte. (2016a). *Third party governance and risk management: The threats are real*. Retrieved from https://www2.deloitte.com/ca/en/pages/risk/articles/reduce-your-third-party-risk.html

Deloitte. (2016b). *Why artificial intelligence is a game changer for risk management*. Retrieved from

Clicours.COM

https://www2.deloitte.com/content/dam/deloitte/us/documents/audit/us-ai-risk-powers-performance.pdf

Deloitte. (2018a). *AI and Risk Management: Innovating with confidence*. Retrieved from https://www.deloitte.com/uk/en/pages/financial-services/articles/ai-and-risk-management.html

Deloitte. (2018b). *Information technology risks in financial services: What board members need to know-and do*. Retrieved from https://www2.deloitte.com/global/en/pages/risk/articles/information-technology-risks-financial-services.html

Deng, X., Low, S. P., Li, Q., & Zhao, X. (2014). Developing Competitive Advantages in Political Risk Management for International Construction Enterprises. *Journal of Construction Engineering and Management, 140*(9), 04014040. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29CO.1943-7862.0000836

Dijk, B. V. (2018). Creating clarity around ownership structures. In B. V. Dijk (Ed.), (pp. 1).

Dionne-Proulx, J., & Larochelle, G. (2010). Éthique et gouvernance d'entreprise. *Management & Avenir, 32*(2), 36-53. Retrieved from https://www.cairn.info/revue-management-et-avenir-2010-2-page-36.htm. doi:10.3917/mav.032.0036

Doorey, D. J. (2011). The Transparent Supply Chain: from Resistance to Implementation at Nike and Levi-Strauss. *Journal of Business Ethics, 103*(4), 587-603. Retrieved from https://doi.org/10.1007/s10551-011-0882-1. doi:10.1007/s10551-011-0882-1

Dow Jones. (2016). *Content definition guide*. Retrieved from https://www.dowjones.com/products/risk-compliance/

Dow Jones. (2018). *Third party risk management - uncover emerging trends*. Retrieved from https://www.dowjones.com/products/risk-compliance/

Dow Jones Risk & Compliance. (2018). *Third Party Risk Management - Uncover emerging trends*. Retrieved from https://www.dowjones.com/products/risk-compliance/

Drennan, L. T. (2004). Ethics, Governance and Risk Management: Lessons From Mirror Group Newspapers and Barings Bank. *Journal of Business Ethics, 52*(3), 257-266. Retrieved from https://doi.org/10.1023/B:BUSI.0000037531.33621.2c. doi:10.1023/B:BUSI.0000037531.33621.2c

Drew, S. A., Kelley, P. C., & Kendrick, T. (2006). CLASS: Five elements of corporate governance to manage strategic risk. *Business Horizons, 49*(2), 127-138. Retrieved from http://www.sciencedirect.com/science/article/pii/S0007681305001011. doi:https://doi.org/10.1016/j.bushor.2005.07.001

Du, P., Yu, S., & Yang, D. (2019). Open Information: Creating a Transparent Sunshine Government. In P. Du, S. Yu, & D. Yang (Eds.), *The Development of E-governance in China: Improving Cybersecurity and Promoting Informatization as Means for Modernizing State Governance* (pp. 67-86). Singapore: Springer Singapore.

Dun & Bradstreet. (2017). *Beneficial ownership structures*. Retrieved from

Ein news. (2016). Retrieved from https://interpol.einnews.com/article_detail/338454951/3z7U5mxyeTx8j1DA?ref=rss&ecode=XDwnc_QgW2Ybuc_M

El-Sabek, L. M., & McCabe, B. Y. (2018). Coordination Challenges of Production Planning in the Construction of International Mega-Projects in The Middle East. *International Journal of Construction Education and Research, 14*(2), 118-140. Retrieved from https://doi.org/10.1080/15578771.2016.1276109. doi:10.1080/15578771.2016.1276109

El-Sayegh, S. M. (2014). Project risk management practices in the UAE construction industry. *International Journal Project Organisation and Management, 6*(1/2), 121.

El colombiano. (2017). Retrieved from https://www.elcolombiano.com/negocios/tercer-carril-bogota-girardot-enredado-por-posible-cartel-FA9165799

El nuevo siglo. (2018). Retrieved from https://www.elnuevosiglo.com.co/articulos/05-2018-accion-para-evitar-desastre-en-hidroituango-procuraduria

Elgg, J. W. V. (2016). *Hidden in Plain Site - Modern slavery in the construction industry*. Retrieved from corporateaccountabilityproject.weblogs.anu.edu.au/hidden-in-plain-sight-modern-slavery-in-the-construction-industry

Elias, P. (2018, 23 octobre 2018). Monsanto weed killer ruling is 1st step in long legal battle. *Washington Post*. Retrieved from https://www.washingtonpost.com/business/judge-upholds-monsanto-verdict-cuts-award-to-78-million/2018/10/22/259dcfa4-d658-11e8-8384-bcc5492fef49_story.html?noredirect=on

Ernst & Young. (2013). *Managing bribery and corruption risks in the construction and infrastructure industry*. Retrieved from https://www.ey.com/Publication/vwLUAssets/FIDS-Sector_focus-Construction_and_inftrastructure/$FILE/Construction%20and%20inftrastructure.pdf

Ernst & Young. (2018). *Can you transform your third parties' risk into a competitive advantage?* Retrieved from United Kingdom: https://www.ey.com/publication/vwluassets/ey-transforming-your-third-party-risk-into-a-competitive-advantage/$file/EY-transforming-your-third-party-risk-into-a-competitive-advantage.pdf

Esayas, S., Mahler, T., Seehusen, F., Bjørnstad, F., & Brubakk, V. (2015, 28-30 Sept. 2015). *An integrated method for compliance and risk assessment.* Paper presented at the 2015 IEEE Conference on Communications and Network Security (CNS).

Ethisphere. (2018). Develop an Ethics & Compliance Roadmap. Retrieved from https://ethisphere.com/what-we-do/program-assessments/

Fairtrade. (2019). Fairtrade Canada. Retrieved from www.fairtrade.ca/

Family security matters. (2016). Retrieved from www.familysecuritymatters.org/publications/id.22699/pub_detail.asp

Fang, C., Marle, F., & Xie, M. (2017). Applying Importance Measures to Risk Analysis in Engineering Project Using a Risk Network Model. *IEEE Systems Journal, 11*(3), 1548-1556. doi:10.1109/JSYST.2016.2536701

Feng, T. (2017, 16-18 June 2017). *A supply chain traceability system for food safety based on HACCP, blockchain & Internet of things.* Paper presented at the 2017 International Conference on Service Systems and Service Management.

Flynn, F. J., & Staw, B. M. (2004). Lend me your wallets: the effect of charismatic leadership on external support for an organization. *Strategic Management Journal, 25*(4), 309-330. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1002/smj.377. doi:10.1002/smj.377

Foroglou, G., & Tsilidou, A. (2015). *Further applications of the blockchain*.

Forrester. (2018). *Internet-Of-Things spending forecat, 2017 to 2023 (Global)*. Retrieved from https://www.forrester.com/report/forrester+analytics+internetofthings+spending+forecast+2017+to+2023+global/-/E-RES142092

Francisco, K., & Swanson, R. (2018). *The Supply Chain Has No Clothes: Technology Adoption of Blockchain for Supply Chain Transparency* (Vol. 2).

Fraser, J. R. S., & Simkins, B. J. (2016). The challenges of and solutions for implementing enterprise risk management. *Business Horizons, 59*(6), 689-698. Retrieved from http://www.sciencedirect.com/science/article/pii/S000768131630057X. doi:https://doi.org/10.1016/j.bushor.2016.06.007

Gadde, L.-E., & Dubois, A. (2010). Partnering in the construction industry—Problems and opportunities. *Journal of Purchasing and Supply Management, 16*(4), 254-263. Retrieved from http://www.sciencedirect.com/science/article/pii/S147840921000066X. doi:https://doi.org/10.1016/j.pursup.2010.09.002

Gallas, D. (2019). Brazil's Odebrecht corruption scandal explained. *BBC South America*. Retrieved from https://www.bbc.com/news/business-39194395

Gambetta, D., & Reuter, P. (2000). Conspiracy among the Many: the Mafia in Legitimate Industries. In N. G. Fielding, A. Clarke, & R. Witt (Eds.), *The Economic Dimensions of Crime* (pp. 99-120). London: Palgrave Macmillan UK.

Garcia, L. C., & Fonseca, A. (2018). The use of administrative sanctions to prevent environmental damage in impact assessment follow-ups. *Journal of Environmental Management, 219*, 46-55. Retrieved from http://www.sciencedirect.com/science/article/pii/S0301479718305036. doi:https://doi.org/10.1016/j.jenvman.2018.04.112

Garnier, F. (2018). MTR-801 Planification de recherche en ingénierie. Montréal: École de Technologie Supérieure.

Gaughan, P. H., & Javalgi, R. G. (2018). A framework for analyzing international business and legal ethical standards. *Business Horizons, 61*(6), 813-822. Retrieved from http://www.sciencedirect.com/science/article/pii/S000768131830106X. doi:https://doi.org/10.1016/j.bushor.2018.07.003

Gibson Grant, L., Crudu, R., & Pilkington, M. (2017). *Blockchain and bitcoin as a way to lift a country out of poverty - tourism 2.0 and e-governance in the Republic of Moldova* (Vol. 7).

Global coalition against corruption. (2018). *Transparency International Corruption Perception Index*. Retrieved from https://www.transparency.org/research/cpi/overview

Global Slavery Index. (2018). *Modern slavery: A hidden, everyday problem*. Retrieved from https://www.globalslaveryindex.org

Gold, S., Trautrims, A., & Trodd, Z. (2015). Modern slavery challenges to supply chain management. *Supply Chain Management: An International Journal, 20*(5), 485-494. Retrieved from https://www.emeraldinsight.com/doi/abs/10.1108/SCM-02-2015-0046. doi:doi:10.1108/SCM-02-2015-0046

Government of Canada. (2018). Know your client requirements. Retrieved from www.fintrac-canafe.gc.ca/guidance-directives/client-clientele/1-eng.asp

Grojean, M. W., Resick, C. J., Dickson, M. W., & Smith, D. B. (2004). Leaders, Values, and Organizational Climate: Examining Leadership Strategies for Establishing an Organizational Climate Regarding Ethics. *Journal of Business Ethics, 55*(3), 223-241. Retrieved from https://doi.org/10.1007/s10551-004-1275-5. doi:10.1007/s10551-004-1275-5

Gubbi, J., Buyya, R., Marusic, S., & Palaniswami, M. (2013). Internet of Things (IoT): A vision, architectural elements, and future directions. *Future Generation Computer Systems, 29*(7), 1645-1660. Retrieved from http://www.sciencedirect.com/science/article/pii/S0167739X13000241. doi:https://doi.org/10.1016/j.future.2013.01.010

Gudienė, N., Banaitis, A., Podvezko, V., & Banaitienė, N. (2014). Identification and evaluation of the critical success factors for construction projects in Lithuania: AHP approach. *Journal of Civil Engineering and Management, 20*(3), 350-359. Retrieved from https://doi.org/10.3846/13923730.2014.914082. doi:10.3846/13923730.2014.914082

Guntzburger, Y., Pauchant, T. C., & Tanguy, P. A. (2018). Empowering Engineering Students in Ethical Risk Management: An Experimental Study. *Science and Engineering Ethics*. Retrieved from https://doi.org/10.1007/s11948-018-0044-2. doi:10.1007/s11948-018-0044-2

Guo, J., Fan, Y., Ai, Q., & Croft, W. B. (2016). *A Deep Relevance Matching Model for Ad-hoc Retrieval*. Paper presented at the Proceedings of the 25th ACM International on Conference on Information and Knowledge Management, Indianapolis, Indiana, USA.

Gupta, B., & al., e. (2017). Analysis of various decision tree algortihms for classification in data mining. *International journal of computer applications, 163*.

Hachey, I. (2012). Prison de Gharyan, projet controversé de SNC-Lavalin. *La Presse*. Retrieved from http://www.lapresse.ca/international/dossiers/crise-dans-le-monde-arabe/la-libye-apres-kadhafi/201203/26/01-4509633-prison-de-gharyan-projet-controverse-de-snc-lavalin.php

Hamilton, J. B., & Knouse, S. B. (2001). Multinational Enterprise Decision Principles for Dealing With Cross Cultural Ethical Conflicts. *Journal of Business Ethics, 31*(1), 77-94. Retrieved from https://doi.org/10.1023/A:1010793408485. doi:10.1023/a:1010793408485

Harding, L. (2016). What are the Panama Papers? A guide to history's biggest data leak. *The guardian*. Retrieved from www.vadai.eu/wp-content/uploads/2017/09/Panama-Papers.pdf.

Heising, J. K., Claassen, G. D. H., & Dekker, M. (2017). Options for reducing food waste by quality-controlled logistics using intelligent packaging along the supply chain. *Food Additives & Contaminants: Part A, 34*(10), 1672-1680. Retrieved from https://doi.org/10.1080/19440049.2017.1315776. doi:10.1080/19440049.2017.1315776

Hellenic shipping. (2018). Retrieved from https://www.hellenicshippingnews.com/uae-energy-minister-hopes-global-oil-markets-begin-to-tighten-in-h2/

Hemphill, T. A., & Lillevik, W. (2011). The Global Economic Ethic Manifesto: Implementing a Moral Values Foundation in the Multinational Enterprise. *Journal of Business Ethics, 101*(2), 213-230. Retrieved from https://doi.org/10.1007/s10551-010-0718-4. doi:10.1007/s10551-010-0718-4

Hernandez, D., & Rudolph, A. (2015). Modern day slavery: What drives human trafficking in Europe? *European Journal of Political Economy, 38*, 118-139. Retrieved from http://www.sciencedirect.com/science/article/pii/S0176268015000075. doi:https://doi.org/10.1016/j.ejpoleco.2015.02.002

Hess, D. (2018). Corruption and the Multinational Corporation. *Ethical theory and Business - Cambridge University Press, 10th*, 14.

Ho, C. M. F. (2011). Ethics management for the construction industry: A review of ethical decision-making literature. *Engineering, Construction and Architectural Management, 18*(5), 516-537. Retrieved from http://dx.doi.org/10.1108/09699981111165194. doi:10.1108/09699981111165194

Hodge, G. A., & Greve, C. (2017). On Public–Private Partnership Performance:A Contemporary Review. *Public Works Management & Policy, 22*(1), 55-78. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/1087724X16657830. doi:10.1177/1087724x16657830

Hommes, P. (2016). *Practical insight into technology deployment and review to ensure ongoing compliance.* Paper presented at the Implementing a Consistent and Efficient Third-Party Due Diligence Process.

Hood, C., & Jones, D. K. C. (1996). *Accident and Design: Contemporary Debates in Risk Management*: UCL Press.

Horne, B., Dron, W., Khedr, S., & Adali, S. (2018). *Assessing the News Landscape: A Multi-Module Toolkit for Evaluating the Credibility of News*.

Horvath, A. (2004). CONSTRUCTION MATERIALS AND THE ENVIRONMENT. *Annual Review of Environment and Resources, 29*(1), 181-204. Retrieved from https://www.annualreviews.org/doi/abs/10.1146/annurev.energy.29.062403.102215. doi:10.1146/annurev.energy.29.062403.102215

Houben, G., Lenie, K., & Vanhoof, K. (1999). A knowledge-based SWOT-analysis system as an instrument for strategic planning in small and medium sized enterprises. *Decision Support Systems, 26*(2), 125-135. Retrieved from http://www.sciencedirect.com/science/article/pii/S016792369900024X. doi:https://doi.org/10.1016/S0167-9236(99)00024-X

Huff, R. (2017). *Ongoing monitoring of third party relationships: defining a risk-based, scalable, and sustainable approach*. Retrieved from

Human Rights Watch. (2018). *World Report*. Retrieved from https://www.hrw.org/sites/default/files/world_report_download/201801world_report_web.pdf

Human Rights Watch. (2019). Kafala system. Retrieved from https://www.hrw.org/tag/kafala-system

Hwang, B.-G., & Ho, J. W. (2012). Front-End Planning Implementation in Singapore: Status, Importance, and Impact. *Journal of Construction Engineering and Management, 138*(4), 567-573. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29CO.1943-7862.0000456 doi:doi:10.1061/(ASCE)CO.1943-7862.0000456

IFLR. (2013). Retrieved from https://www.iflr.com/Article/3196287/Indian-bribery-and-corruption-exposed.html?ArticleId=3196287

Institute of development studies. (2018). Modern slavery briefing. In I. f. d. studies (Ed.).

International Labour Organization. (2019). Labour migration. Retrieved from https://www.ilo.org/beirut/areasofwork/labour-migration/lang--en/index.htm

International Organization for Standardization. (2010). ISO 26 000 Social responsability. In.

International Organization for Standardization. (2014). ISO 19600 Compliance Management. In.

International Organization for Standardization. (2016). ISO-37 001 Anti-Bribery management systems. Retrieved from https://www.iso.org/standard/65034.html.

Iqbal, S. (2015). Risk mangement in construction projects. *Technological and economic development of economy, 21*(1), 65-78. Retrieved from https://journals.vgtu.lt/index.php/TEDE/article/view/1043/806.

Iqbal, S., Choudhry, R. M., Holschemacher, K., Ali, A., & Tamošaitienė, J. (2015). Risk management in construction projects. *Technological and economic development of economy, 21*(1), 65-78. Retrieved from https://doi.org/10.3846/20294913.2014.994582. doi:10.3846/20294913.2014.994582

Ittner, C. D., & Keusch, T. (2017). Incorporating risk considerations into planning and control systems: The influence of risk management value creation objectives. In *The Routledge Companion to Accounting and Risk* (pp. 150-171).

Ivanov, D., Dolgui, A., Sokolov, B., Werner, F., & Ivanova, M. (2016). A dynamic model and an algorithm for short-term supply chain scheduling in the smart factory industry 4.0. *International Journal of Production Research, 54*(2), 386-402. Retrieved from https://doi.org/10.1080/00207543.2014.999958. doi:10.1080/00207543.2014.999958

J Lait, A., & Randell, B. (2019). *An assessment of name matching algorithms*.

Jaber, J. O., Elkarmi, F., Alasis, E., & Kostas, A. (2015). Employment of renewable energy in Jordan: Current status, SWOT and problem analysis. *Renewable and Sustainable Energy Reviews, 49*, 490-499. Retrieved from http://www.sciencedirect.com/science/article/pii/S1364032115003202. doi:https://doi.org/10.1016/j.rser.2015.04.050

Jaffee, D. (2015). The fair trade scandal: marketing poverty to benefit the rich. *The Journal of Peasant Studies, 42*(5), 1052-1056. Retrieved from https://doi.org/10.1080/03066150.2015.1072972. doi:10.1080/03066150.2015.1072972

Johnson, C. E. (2018). *Meeting the ethical challenges of leadership* (6th ed.): SAGE.

Jong, J. d., Meyer, A., & Owens, J. (2017). *Using blockchain for transparent beneficial ownership registers*. Retrieved from International Tax Review:

Joshi, M., & McKendall, M. (2018). Responses to the Discovery of Unethical Acts: An Organizational Identity and Reputation Perspective. *Business & Society, 57*(4), 706-741. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/0007650315623953. doi:10.1177/0007650315623953

Kangas, J., Tikkanen, J., Leskinen, P., Kurttila, M., & Kajanus, M. (2017). Developing hybrid SWOT methodologies for choosing joint bioeconomy co-operation priorities by three Finnish universities. *Biofuels, 8*(4), 459-471. Retrieved from https://doi.org/10.1080/17597269.2016.1271625. doi:10.1080/17597269.2016.1271625

Kelly, J. E., & Hamm, S. (2013). *Smart Machines: IBM's Watson and the era of cognitive computing*.

Khan, A., & Harroff-Tavel, H. (2011). Reforming the Kafala: Challenges and Opportunities in Moving Forward. *Asian and Pacific Migration Journal, 20*(3-4), 293-313. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/011719681102000303. doi:10.1177/011719681102000303

Khurana, R. (2002). *Searching for a corporate savior: The irrational quest for charismatic CEOs*.

Kim, B. (2017). Sustainable Supply Chain Management. In *Optimal Control Applications for Operations Strategy* (pp. 175-211). Singapore: Springer Singapore.

Kim, H. M., & Laskowski, M. (2018). Toward an ontology-driven blockchain design for supply-chain provenance. *Intelligent Systems in Accounting, Finance and Management, 25*(1), 18-27. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1002/isaf.1424. doi:10.1002/isaf.1424

Kim, K., & Kang, T. (2017). Does technology against corruption always lead to benefit? The potentital risks and challenges of the blockchain technology. *OECD Global Anti-Corruption & Integrity forum*, 22.

Kirchgässner, G. (2017). On Estimating the Size of the Shadow Economy. *German Economic Review, 18*(1), 99-111. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/geer.12094. doi:10.1111/geer.12094

Knights, D., & O'Leary, M. (2006). Leadership, Ethics and Responsibility to the Other. *Journal of Business Ethics, 67*(2), 125-137. Retrieved from https://doi.org/10.1007/s10551-006-9008-6. doi:10.1007/s10551-006-9008-6

KPMG. (2017). *Does your third-party risk management program extend for enough?* Retrieved from https://advisory.kpmg.us/content/dam/kpmg-advisory/risk-consulting/pdfs/2017/04/fourth-party-risk-management.pdf

Krysiak, F. C. (2009). Risk Management as a Tool for Sustainability. *Journal of Business Ethics, 85*(3), 483. Retrieved from https://doi.org/10.1007/s10551-009-0217-7. doi:10.1007/s10551-009-0217-7

Kuo, T.-T., Kim, H.-E., & Ohno-Machado, L. (2017). Blockchain distributed ledger technologies for biomedical and health care applications. *Journal of the American Medical Informatics Association, 24*(6), 1211-1220. Retrieved from https://doi.org/10.1093/jamia/ocx068. doi:10.1093/jamia/ocx068

La republica. (2018). Retrieved from https://www.larepublica.co/economia/accion-de-conconcreto-cayo-por-revelaciones-de-auditoria-2764186

Larsen, J. K., Shen, G. Q., Lindhard, S. M., & Brunoe, T. D. (2016). Factors Affecting Schedule Delay, Cost Overrun, and Quality Level in Public Construction Projects. *Journal of Management in Engineering, 32*(1), 04015032. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29ME.1943-5479.0000391 doi:doi:10.1061/(ASCE)ME.1943-5479.0000391

Lawton, A., & Páez, I. (2015). Developing a Framework for Ethical Leadership. *Journal of Business Ethics, 130*(3), 639-649. Retrieved from https://doi.org/10.1007/s10551-014-2244-2. doi:10.1007/s10551-014-2244-2

Lazer, D. M. J., Baum, M. A., Benkler, Y., Berinsky, A. J., Greenhill, K. M., Menczer, F., . . . Zittrain, J. L. (2018). The science of fake news. *Science, 359*(6380), 1094-1096. Retrieved from https://science.sciencemag.org/content/sci/359/6380/1094.full.pdf. doi:10.1126/science.aao2998

Lektzian, D., & Patterson, D. (2015). Political Cleavages and Economic Sanctions: The Economic and Political Winners and Losers of Sanctions. *International Studies Quarterly, 59*(1), 46-58. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/isqu.12198. doi:doi:10.1111/isqu.12198

Lewis, H., Dwyer, P., Hodkinson, S., & Waite, L. (2015). Hyper-precarious lives:Migrants, work and forced labour in the Global North. *Progress in Human Geography, 39*(5), 580-600. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/0309132514548303. doi:10.1177/0309132514548303

Li, B.-h., Hou, B.-c., Yu, W.-t., Lu, X.-b., & Yang, C.-w. (2017). Applications of artificial intelligence in intelligent manufacturing: a review. *Frontiers of Information Technology & Electronic Engineering, 18*(1), 86-96. Retrieved from https://doi.org/10.1631/FITEE.1601885. doi:10.1631/fitee.1601885

Liao, P.-C., Xia, N.-N., Wu, C.-L., Zhang, X.-L., & Yeh, J.-L. (2017). Communicating the corporate social responsibility (CSR) of international contractors: Content analysis of CSR reporting. *Journal of Cleaner Production, 156*, 327-336. Retrieved from http://www.sciencedirect.com/science/article/pii/S0959652617307333. doi:https://doi.org/10.1016/j.jclepro.2017.04.027

Liu, J., Zhao, X., & Yan, P. (2016). Risk Paths in International Construction Projects: Case Study from Chinese Contractors. *Journal of Construction Engineering and Management, 142*(6), 05016002. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29CO.1943-7862.0001116 doi:doi:10.1061/(ASCE)CO.1943-7862.0001116

Locatelli, G., Mariani, G., Sainati, T., & Greco, M. (2017). Corruption in public projects and megaprojects: There is an elephant in the room! *International Journal of Project Management, 35*(3), 252-268. Retrieved from http://www.sciencedirect.com/science/article/pii/S0263786316301090. doi:https://doi.org/10.1016/j.ijproman.2016.09.010

Loosemore, M. (2006). *Risk Management in projects*. New-York.

Loosemore, M., & Cheung, E. (2015). Implementing systems thinking to manage risk in public private partnership projects. *International Journal of Project Management, 33*(6), 1325-1334. Retrieved from http://www.sciencedirect.com/science/article/pii/S0263786315000381. doi:https://doi.org/10.1016/j.ijproman.2015.02.005

Loosemore, M., & Muslmani, H. S. A. (1999). Construction project management in the Persian Gulf: inter-cultural communication. *International Journal of Project Management, 17*(2), 95-100. Retrieved from http://www.sciencedirect.com/science/article/pii/S0263786398000301. doi:https://doi.org/10.1016/S0263-7863(98)00030-1

Lu, W., Ye, M., Flanagan, R., & Ye, K. (2016). Corporate Social Responsibility Disclosures in International Construction Business: Trends and Prospects. *Journal of Construction Engineering and Management, 142*(1), 04015053. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29CO.1943-7862.0001034

Mani, V., Gunasekaran, A., Papadopoulos, T., Hazen, B., & Dubey, R. (2016). Supply chain social sustainability for developing nations: Evidence from India. *Resources, Conservation and Recycling, 111*, 42-52. Retrieved from http://www.sciencedirect.com/science/article/pii/S0921344916300763. doi:https://doi.org/10.1016/j.resconrec.2016.04.003

Manworren, N., Letwat, J., & Daily, O. (2016). Why you should care about the Target data breach. *Business Horizons, 59*(3), 257-266. Retrieved from http://www.sciencedirect.com/science/article/pii/S0007681316000033. doi:https://doi.org/10.1016/j.bushor.2016.01.002

Market screener. (2019). Retrieved from https://www.marketscreener.com/WESTINGHOUSE-AIR-BRAKE-TE-14842/news/WESTINGHOUSE-AIR-BRAKE-TECHNOLOGIES-MANAGEMENT-S-DISCUSSION-AND-ANALYSIS-OF-FINANCIAL-CONDITION-AN-24878173/http://semanariovoz.com/hidroituango-la-comision-acusaciones-investigar/

Martin, K. E. (2015). Ethical Issues in the Big Data Industry. *Strategic Management & Public Policy*, 19. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2598956#.

Mathieu, A., & Soparnot, R. (2009). Les dimensions ontologiques, stratégiques et organisationnelles de l'appropriation du concept de développement durable en entreprise. *Management & Avenir, 23*(3), 199-218. Retrieved from https://www.cairn.info/revue-management-et-avenir-2009-3-page-199.htm. doi:10.3917/mav.023.0199

McCorquodale, R., Smit, L., Neely, S., & Brooks, R. (2017). Human Rights Due Diligence in Law and Practice: Good Practices and Challenges for Business Enterprises. *Business and Human Rights Journal, 2*(2), 195-224. Retrieved from https://www.cambridge.org/core/article/human-rights-due-diligence-in-law-and-practice-good-practices-and-challenges-for-business-enterprises/0306945323DD6F6C9392C5DBDE167001. doi:10.1017/bhj.2017.2

Meardi, G., Martín, A., & Riera, M. L. (2012). Constructing Uncertainty: Unions and Migrant Labour in Construction in Spain and the UK. *Journal of Industrial Relations, 54*(1), 5-21. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/0022185611432388. doi:10.1177/0022185611432388

Mhetre, K. (2016). Risk management in construction industry. *International Journal of Engineering Research, 5*(1), 153-155. Retrieved from https://www.researchgate.net/profile/Amarsinh_Landage/publication/301589805_Risk_Management_in_Construction_Industry/links/571b559d08ae7f552a48112a/Risk-Management-in-Construction-Industry.pdf.

Millward, P. (2017). World Cup 2022 and Qatar's construction projects: Relational power in networks and relational responsibilities to migrant workers. *Current Sociology, 65*(5), 756-776. Retrieved from

https://journals.sagepub.com/doi/abs/10.1177/0011392116645382. doi:10.1177/0011392116645382

Nations Unies. (2019). Objectifs de développement durable. Retrieved from https://www.un.org/sustainabledevelopment/fr/

NAVEX Gobal. (2018). *Ethics & Compliance Third-Party Risk Management Benchmark Report*. Retrieved from https://www.navexglobal.com/en-us/resource-center

New, S. J. (2015). Modern slavery and the supply chain: the limits of corporate social responsibility? *Supply Chain Management: An International Journal, 20*(6), 697-707. Retrieved from https://www.emeraldinsight.com/doi/abs/10.1108/SCM-06-2015-0201. doi:doi:10.1108/SCM-06-2015-0201

New York State. (2018). Retrieved from https://www.governor.ny.gov/news/governor-cuomo-announces-vapor-stone-rail-systems-expansion-plattsburgh-international-airport

Ng, I., Scharf, K., Pogrebna, G., & Maull, R. (2015). Contextual variety, Internet-of-Things and the choice of tailoring over platform: Mass customisation strategy in supply chain management. *International Journal of Production Economics, 159*, 76-87. Retrieved from http://www.sciencedirect.com/science/article/pii/S0925527314002850. doi:https://doi.org/10.1016/j.ijpe.2014.09.007

Njoh, A. J. (2017). The SWOT model's utility in evaluating energy technology: Illustrative application of a modified version to assess the sawdust cookstove's sustainability in Sub-Saharan Africa. *Renewable and Sustainable Energy Reviews, 69*, 313-323. Retrieved from http://www.sciencedirect.com/science/article/pii/S1364032116308450. doi:https://doi.org/10.1016/j.rser.2016.11.049

Nordin, R. M., Takim, R., & Nawawi, A. H. (2013). Behavioural Factors of Corruption in the Construction Industry. *Procedia - Social and Behavioral Sciences, 105*, 64-74. Retrieved from http://www.sciencedirect.com/science/article/pii/S1877042813043838. doi:https://doi.org/10.1016/j.sbspro.2013.11.008

North Jersey. (2018). Retrieved from https://www.northjersey.com/story/news/new-jersey/2018/10/09/federal-authorities-wiretapped-george-norcross-2016-report-says/1581016002/

NY Times. (2016). Retrieved from https://www.nytimes.com/2016/10/18/world/middleeast/iran-siamak-namazi-video.html

Nysten-Haarala, S., Klyuchnikova, E., & Helenius, H. (2015). Law and self-regulation – Substitutes or complements in gaining social acceptance? *Resources Policy, 45*, 52-64. Retrieved from http://www.sciencedirect.com/science/article/pii/S0301420715000240. doi:https://doi.org/10.1016/j.resourpol.2015.02.008

O'Neil, C. (2017). *Les défis de la conformité et de l'exécution des meilleures stratégies pour assurer la qualité et l'intégrité des services d'ingénierie.* (Master), École de technologie supérieure, Montréal.

O.C. Ferrell, J. F. (2015). *Business Ethics: Ethical Decision Making & Cases*.

Observer. (2018). Retrieved from

Clicours.COM

https://observer.com/2018/04/nj-politics-digest-nj-legislators-hope-voters-will-pay-big-for-school-security/

OD4D. (2016). *Open Data Barometer*. Retrieved from

OECD. (2003a). *Managing conflict of interest in the public service*. Retrieved from http://www.oecd.org/governance/ethics/2957360.pdf

OECD. (2003b). *Recommendation of the council on guidelines for managing conflict of interest in the public service*. Retrieved from www.oecd.org/governance/ethics/2957360.pdf

OECD. (2012). *Forum on tax administration: reducing opportunities for tax non-compliance in the underground economy*. Retrieved from www.oecd.org/tax/forum-on-tax-administration/publications-and-products/individuals/49427993.pdf

OECD. (2014a). *Foreign bribery report: An analysis of the crime of bribery of foreign public officials*. Retrieved from https://www.oecd.org/corruption/oecd-foreign-bribery-report-9789264226616-en.htm

OECD. (2014b). *The rationale for fighting corruption*. Retrieved from https://www.oecd.org/cleangovbiz/49693613.pdf

OECD. (2018). *Blockchain Technology and Corporate Governance*. Retrieved from

OIQ. (2018). Code de déontologie de l'ingénieur. Retrieved from http://gpp.oiq.qc.ca/obligation_d_integrite.htm

Ola-Awo, Wasiu, A., & Bin Amirudin, R. (2016). *Barriers to Partnering Implementation in Nigeria Construction Industry: Perceptions of the Stakeholders*.

Oladinrin, O. T., & Ho, C. M.-F. (2016). Enabling Ethical Code Embeddedness in Construction Organizations: A Review of Process Assessment Approach. *Science and Engineering Ethics, 22*(4), 1193-1215. Retrieved from https://doi.org/10.1007/s11948-015-9679-4. doi:10.1007/s11948-015-9679-4

Olleros, F. X., & Zhegu, M. (2016). *Research Handbook on digital transformations*.

Ølnes, S., Ubacht, J., & Janssen, M. (2017). Blockchain in government: Benefits and implications of distributed ledger technology for information sharing. *Government Information Quarterly, 34*(3), 355-364. Retrieved from http://www.sciencedirect.com/science/article/pii/S0740624X17303155. doi:https://doi.org/10.1016/j.giq.2017.09.007

Osei-Kyei, R., & Chan, A. P. C. (2015). Review of studies on the Critical Success Factors for Public–Private Partnership (PPP) projects from 1990 to 2013. *International Journal of Project Management, 33*(6), 1335-1346. Retrieved from http://www.sciencedirect.com/science/article/pii/S0263786315000411. doi:https://doi.org/10.1016/j.ijproman.2015.02.008

Oxford Economics. (2015). *Global Construction 2030*. Retrieved from London:

Ozorhon, B., Arditi, D., Dikmen, I., & Birgonul, M. T. (2008). Effect of Partner Fit in International Construction Joint Ventures. *Journal of Management in Engineering, 24*(1), 12-20. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%290742-597X%282008%2924%3A1%2812%29 doi:doi:10.1061/(ASCE)0742-597X(2008)24:1(12)

PACI. (2013). *Good Practice Guidelines on Conducting Third-Party Due Diligence*. Retrieved from

https://s1.q4cdn.com/259923520/files/doc_downloads/WEF_PACI_ConductingThirdPartyDueDiligence_Guidelines_2013.pdf

Parra Moyano, J., & Ross, O. (2017). KYC Optimization Using Distributed Ledger Technology. *Business & Information Systems Engineering, 59*(6), 411-423. Retrieved from https://doi.org/10.1007/s12599-017-0504-2. doi:10.1007/s12599-017-0504-2

Petrick, J. A., & Quinn, J. F. (2000). The Integrity Capacity Construct and Moral Progress in Business. *Journal of Business Ethics, 23*(1), 3-18. Retrieved from https://doi.org/10.1023/A:1006214726062. doi:10.1023/a:1006214726062

Petschow, U., Rosenau, J., & Weizsacker, E. U. v. (2017). *Governance and sustainability: New challenges for states, companies and civil society*: Greenleaf.

Philp, R. B. (2012). *Environmental issues for twenty-first century and their impact on human health* (Kindle Ed.).

Pissed consumer. (2016). Retrieved from https://united-states-district-court-for-the-district-of-new-jersey.pissedconsumer.com/jerome-b-simandle-review-in-government-and-politics-category-20161221977073.html

Ponemon. (2018). *Second annual study on the Internet of Things (IoT): A new era of third-party risk*. Retrieved from https://sharedassessments.org/studies/

Porcnik, I. V. T. (2018). *Human Freedom Index*. Retrieved from https://www.cato.org/human-freedom-index-new

Preiser, R., & Cilliers, P. (2010). Unpacking the Ethics of Complexity: Concluding Reflections. In P. Cilliers & R. Preiser (Eds.), *Complexity, Difference and Identity: An Ethical Perspective* (pp. 265-287). Dordrecht: Springer Netherlands.

Press TV. (2016). Retrieved from https://www.presstv.com/Detail/2016/10/19/489729/Iran-US-Namazi

Quezada, L. E., Cordova, F. M., Palominos, P., Godoy, K., & Ross, J. (2009). Method for identifying strategic objectives in strategy maps. *International Journal of Production Economics, 122*(1), 492-500. Retrieved from http://www.sciencedirect.com/science/article/pii/S0925527309002138. doi:https://doi.org/10.1016/j.ijpe.2009.06.019

Raialyoum. (2017). Retrieved from https://www.raialyoum.com/index.php/

Rao, M., Chhabria, R., Gunasekaran, A., & Mandal, P. (2018). Improving competitiveness through performance evaluation using the APC model: A case in micro-irrigation. *International Journal of Production Economics, 195*, 1-11. Retrieved from http://www.sciencedirect.com/science/article/pii/S0925527317303018. doi:https://doi.org/10.1016/j.ijpe.2017.09.017

Reefke, H., & Sundaram, D. (2017). Key themes and research opportunities in sustainable supply chain management – identification and evaluation. *Omega, 66*, 195-211. Retrieved from http://www.sciencedirect.com/science/article/pii/S0305048316000347. doi:https://doi.org/10.1016/j.omega.2016.02.003

Renault, B. Y. (2016). *Risk management in the construction industry: a new literature review*. Paper presented at the IBCC, Johannesburg, South Africa.

Reuters. (2015). Retrieved from https://www.reuters.com/article/iran-usa-arrest/update-2-iranian-american-businessman-detained-in-iran-source-idUSL1N12U01B20151030

Richter, D. M., & Paretti, M. C. (2009). Identifying barriers to and outcomes of interdisciplinarity in the engineering classroom. *European Journal of Engineering Education, 34*(1), 29-45. Retrieved from https://doi.org/10.1080/03043790802710185. doi:10.1080/03043790802710185

Riivari, E., & Lämsä, A.-M. (2019). Organizational Ethical Virtues of Innovativeness. *Journal of Business Ethics, 155*(1), 223-240. Retrieved from https://doi.org/10.1007/s10551-017-3486-6. doi:10.1007/s10551-017-3486-6

Rodríguez, L. C., Montiel, I., & Ozuna, T. (2014). A Conceptualization of How Firms Engage in Corporate Responsibility Based on Country Risk. *Business & Society, 53*(5), 625-651. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/0007650312475123. doi:10.1177/0007650312475123

Roehrich, J. K., Lewis, M. A., & George, G. (2014). Are public–private partnerships a healthy option? A systematic literature review. *Social Science & Medicine, 113*, 110-119. Retrieved from http://www.sciencedirect.com/science/article/pii/S0277953614002871. doi:https://doi.org/10.1016/j.socscimed.2014.03.037

Roeser, S. (2010). *Emotions and risky technologies*.

Roeser, S. (2012). Emotional Engineers: Toward Morally Responsible Design. *Science and Engineering Ethics, 18*(1), 103-115. Retrieved from https://doi.org/10.1007/s11948-010-9236-0. doi:10.1007/s11948-010-9236-0

Roy, V., & al., e. (2019a). *Methodology to conduct third party's risk-based due diligence in construction engineering industry*. Submitted to Journal of Business Ethics.

Roy, V., & al., e. (2019b). *Third party integrity management in construction engineering industry*. Submitted to Journal of Construction Engineering and Management.

Sadgrove, K. (2015). *The complete guide to business risk management* (3rd ed.): Routledge.

Scalza, A. A. (2008). *Ethics in the Construction Industry: Teaching students ethics in this 21st century global market.* Paper presented at the Mid-Atlantic conference of the American Society for Engineering Education, Farmingdale State College.

Scarpa, S. (2008). *Trafficking in Human Beings modern slavery*: Oxford University Press.

Schaefer, T. (2017). COMMON RISKS: A dynamic set of internal and external threats includes loss of data and revenue, sabotage at the hands of current or former employees, and a PR nightmare. *Strategic Finance, 99*(5). Retrieved from https://go.galegroup.com/ps/anonymous?id=GALE%7CA515580030&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=1524833X&p=AONE&sw=w.

Schein, E. H. (2010). *Organizational culture and leadership* (4th ed.).

Sedita, S. R., & Apa, R. (2015). The impact of inter-organizational relationships on contractors' success in winning public procurement projects: The case of the construction industry in the Veneto region. *International Journal of Project Management, 33*(7), 1548-1562. Retrieved from http://www.sciencedirect.com/science/article/pii/S0263786315000873. doi:https://doi.org/10.1016/j.ijproman.2015.05.001

Shen, W., Li, G., Lin, C.-L., & Liang, H. (2018). *Foundation of a Framework to Support Compliance Checking in Construction Industry*, Cham.

Ship and bunker. (2017). Retrieved from https://shipandbunker.com/news/emea/149303-market-flat-as-traders-shrug-off-more-opec-talk-that-its-crude-cutbacks-are-working

Slagmulder, R., & Devoldere, B. (2018). Transforming under deep uncertainty: A strategic perspective on risk management. *Business Horizons, 61*(5), 733-743. Retrieved from http://www.sciencedirect.com/science/article/pii/S0007681318300715. doi:https://doi.org/10.1016/j.bushor.2018.05.001

Slavefreetrade. (2019). Slavefreetrade. Retrieved from https://slavefreetrade.org/index.html

Smyth, H., Fellows, R., Liu, A., & Tijhuis, W. (2016). Editorial for the Special Issue on Business Development and Marketing in Construction. *Construction Management and Economics, 34*(4-5), 205-217. Retrieved from https://doi.org/10.1080/01446193.2016.1199370. doi:10.1080/01446193.2016.1199370

SNC-Lavalin. (2017). *Code of ethics and business conduct*. Retrieved from Montreal: http://www.snclavalin.com/en/files/documents/policies/1003_en.pdf

SNC-Lavalin. (2019). *Code of ethics and business conduct*. Retrieved from http://www.snclavalin.com/fr/files/documents/policies/1003_en.pdf

Snyder, J. (2019, 07/02/2019). Billions at stake for SNC-Lavalin — corruption conviction would bar firm from federal contracts for 10 years. *National Post*. Retrieved from https://nationalpost.com/news/politics/billions-at-stake-for-snc-lavalin-corruption-conviction-would-bar-firm-from-federal-contracts-for-10-years

Spedding, L. S. (2009). *Due diligence handbook - Corporate governance, risk management and business planning*.

Stantec. (2017). *Sustainability report*. Retrieved from https://www.stantec.com/content/dam/stantec/files/PDFAssets/2018/stn-2017-sustainability-report.pdf

California Transparency in Supply Chains Act, (2010).

Steets, E. S. J. (2016). *The use of third-party monitoring in insecure contexts*. Retrieved from

Stevens, B. (2008). Corporate Ethical Codes: Effective Instruments For Influencing Behavior. *Journal of Business Ethics, 78*(4), 601-609. Retrieved from https://doi.org/10.1007/s10551-007-9370-z. doi:10.1007/s10551-007-9370-z

Stevenson, M., & Cole, R. (2018). Modern slavery in supply chains: a secondary data analysis of detection, remediation and disclosure. *Supply Chain Management: An International Journal, 23*(2), 81-99. Retrieved from https://www.emeraldinsight.com/doi/abs/10.1108/SCM-11-2017-0382. doi:doi:10.1108/SCM-11-2017-0382

Stronger Together. (2019). *A toolkit for tackling modern slavery in the Construction sector*. Retrieved from United Kingdom: https://www.stronger2gether.org/resources/

Sunlight Foundation. (2019). Sunlight Foundation. Retrieved from https://sunlightfoundation.com

Syed, F. (2018, 4 mai 2018). A court will decide: what does Loblaw owe the workers who died making its clothes in Bangladesh? *The star*. Retrieved from https://www.thestar.com/news/canada/2018/05/04/an-ontario-court-will-decide-what-does-loblaw-owe-the-workers-who-died-making-its-clothes-in-bangladesh.html

Tacchini, E., & al., e. (2017). *Some Like it Hoax: Automated Fake News Detection in Social Networks*. Retrieved from

Tah, J. H. M., & Carr, V. (2001). Knowledge-Based Approach to Construction Project Risk Management. *Journal of Computing in Civil Engineering, 15*(3), 170-177. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%290887-3801%282001%2915%3A3%28170%29 doi:doi:10.1061/(ASCE)0887-3801(2001)15:3(170)

Tang, W., Qiang, M., Duffield, C. F., Young, D. M., & Lu, Y. (2007). Risk Management in the Chinese Construction Industry. *Journal of Construction Engineering and Management, 133*(12), 944-956. Retrieved from https://ascelibrary.org/doi/abs/10.1061/%28ASCE%290733-9364%282007%29133%3A12%28944%29

Taroun, A. (2014). Towards a better modelling and assessment of construction risk: Insights from a literature review. *International Journal of Project Management, 32*(1), 101-115. Retrieved from http://www.sciencedirect.com/science/article/pii/S0263786313000410. doi:https://doi.org/10.1016/j.ijproman.2013.03.004

Tax Justice Network. (2018). Financial Secrecy Index. Retrieved from https://www.financialsecrecyindex.com/introduction/fsi-2018-results

Taylor, M. B. (2009). Due diligence for human rights: A risk based approach. *Corporate Social Responsibility Initiative, 53*, 25. Retrieved from https://sites.hks.harvard.edu/m-rcbg/CSRI/research/publications/workingpaper_53_taylor_etal.pdf.

Teichmann, F. M. J. (2018). Anti-bribery compliance incentives. *Journal of Financial Crime, 25*(4), 1105-1110. Retrieved from https://www.emeraldinsight.com/doi/abs/10.1108/JFC-09-2017-0081. doi:doi:10.1108/JFC-09-2017-0081

The American Report. (2016). Retrieved from https://theamericanreport.org/2016/09/22/obama-clinton-handed-port-canaveral-to-brother-of-saddam-husseins-nuclear-bomb-mastermind/

Debarment with conditional release & integrity compliance, (2010).

Thomson Reuters. (2016). *Third party risk: exposing the gaps*. Retrieved from

Tjahjono, B., Esplugues, C., Ares, E., & Pelaez, G. (2017). What does Industry 4.0 mean to Supply Chain? *Procedia Manufacturing, 13*, 1175-1182. Retrieved from http://www.sciencedirect.com/science/article/pii/S2351978917308302. doi:https://doi.org/10.1016/j.promfg.2017.09.191

TRACE. (2018a). *Risk-Based Due Diligence*. Retrieved from https://www.traceinternational.org/due-diligence

TRACE. (2018b). TRACE Bribery Risk Matrix. Retrieved from https://www.traceinternational.org/trace-matrix

Transparency International. (2011). *Bribe payers index*. Retrieved from https://www.transparency.org/research/bpi/overview

Transparency International UK. (2016). *Managing third party risk: only as strong as your weakest link*. Retrieved from https://www.transparency.org.uk/publications/mangaing-third-party-risk-only-as-strong-as-your-weakest-link/

UK Department of Justice. (2018). *2018 UK annual report on Modern Slavery*. Retrieved from United Kingdom:

UK Bribery Act, (2010).
UK Modern Slavery Act, (2015).
The International Bill of Human Rights, (1948).
Guiding principles on business and human rights, (2011).
United Nations. (2014). *A world that counts*. Retrieved from
United Nations. (2018). *Human Development Indices and Indicators*. Retrieved from hdr.unpd.org/sites/default/files/2018_human_development_statistical_update.pdf
Foreign Corrupt Pratices Act, (1977).
United States of America. (2018). Specially Designated Nationals and Blocked Persons list (SDN). Retrieved from https://www.treasury.gov/resource-center/sanctions/SDN-list/pages/default.aspx
Guidelines Manual, (2018).
Uzun, H., Szewczyk, S. H., & Varma, R. (2004). Board Composition and Corporate Fraud. *Financial Analysts Journal, 60*(3), 33-43. Retrieved from https://doi.org/10.2469/faj.v60.n3.2619. doi:10.2469/faj.v60.n3.2619
Vermeulen, E. P. M. (2013). Beneficial Ownership and Control. Retrieved from https://www.oecd-ilibrary.org/content/paper/5k4dkhwckbzv-en. doi:doi:https://doi.org/10.1787/5k4dkhwckbzv-en
Vice. (2014). Retrieved from https://www.vice.com/en_us/article/vba4vx/corruption-is-rampant-and-new-jersey-is-cool-with-it?utm_source=vicefbus
Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. *Science, 359*(6380), 1146-1151. Retrieved from https://science.sciencemag.org/content/sci/359/6380/1146.full.pdf. doi:10.1126/science.aap9559
Voz. (2018). Retrieved from http://semanariovoz.com/hidroituango-la-comision-acusaciones-investigar/
Vries, M. F. R. K. d. (1993). *Leaders, fools and impostors*.
W radio. (2018). Retrieved from https://www.wradio.com.co/noticias/actualidad/por-cartelizacion-conconcreto-gano-el-contrato-de-la-via-bogotagirardot-superindustria/20180815/nota/3786658.aspx
Walk Free Foundation. (2018). *The Global Slavery Index 2018*. Retrieved from https://www.globalslaveryindex.org/resources/downloads/
Watson, S., & Serra, J. (2016). Managing and creating value from third-party risk. *Renewable Energy Focus, 17*(3), 99-101. Retrieved from http://www.sciencedirect.com/science/article/pii/S1755008416300321. doi:https://doi.org/10.1016/j.ref.2016.05.002
We got the numbers. (2012). Retrieved from https://wegotthenumbers.org/resources/non-fiction-books/days-of-destruction/
White, R. (2013). *Transnational environmental crime*. London: 1.
Wøien, J., Hosseini, A., Klakegg, O. J., Lædre, O., & Lohne, J. (2016). Partnering Elements' Importance for Success in the Norwegian Construction Industry. *Energy Procedia, 96*, 229-240. Retrieved from http://www.sciencedirect.com/science/article/pii/S187661021630769X. doi:https://doi.org/10.1016/j.egypro.2016.09.130

World Bank. (2013). World Bank Debars SNC-Lavalin Inc. and its Affiliates for 10 years. Retrieved from http://www.worldbank.org/en/news/press-release/2013/04/17/world-bank-debars-snc-lavalin-inc-and-its-affiliates-for-ten-years

WSP. (2018). *Code of conduct*. Retrieved from http://cdn.wsp-pb.com/ld2hpi/code-of-conduct.pdf

Yang, S., Shu, K., Wang, S., Gu, R., Wu, F., & Liu, H. (2019). *Unsupervised Fake News Detection on Social Media: A Generative Approach*.

Zavadskas, E. K., Turskis, Z., & Tamosaitiene, J. (2011). Selection of construction enterprises management strategy based on the SWOT and multi-criteria analysis. *Archives of Civil and Mechanical Engineering, 11*(4), 1063-1082. Retrieved from http://www.sciencedirect.com/science/article/pii/S164496651260096X. doi:https://doi.org/10.1016/S1644-9665(12)60096-X

Zhang, X. (2005). Criteria for selecting the private-sector partner in public-private partnerships. *Journal of Construction Engineering and Management, 131*(6), 631-644. Retrieved from https://www.scopus.com/inward/record.uri?eid=2-s2.0-20444435000&doi=10.1061%2f%28ASCE%290733-9364%282005%29131%3a6%28631%29&partnerID=40&md5=d03a50afa111ae654c9d4728823fe0a2. doi:10.1061/(ASCE)0733-9364(2005)131:6(631)

Zhao, X., Hwang, B.-G., & Low, S. P. (2015). Enterprise risk management in international construction firms: drivers and hindrances. *Engineering, Construction and Architectural Management, 22*(3), 347-366. Retrieved from https://www.emeraldinsight.com/doi/abs/10.1108/ECAM-09-2014-0117. doi:doi:10.1108/ECAM-09-2014-0117

Zou, Y., Tuominen, L., Seppänen, O., & Guo, B. H. W. (2019). *Visualisation of Risk Information in BIM to Support Risk Mitigation and Communication: Case Studies*, Cham.