Tableau_Analyse_Articles_Facteurs_Referencement

Code domaine	Domaine de facteur	Code	Catégorie de facteur		Type de facteur	Code facteur		nb fact	Tot
INO	**INNOVATION CARACTERISTICS**	**1**	**Intrinsinc**	**a**	Technical aspects	**1**	interoperability among applications software	**6**	**11**
						2	Maturity of the technology / completeness / reliability / robustness		**6**
						3	consistent IT platform, information sharing, collaboration planning and operation integration		**2**
						4	hardware requirements		**1**
						5	modifiability / adaptability		**1**
						6	Type of licenses/ Licensing product to members other than owner and client		**1**
				b	Economical aspects	**7**	maintenance costs / running costs (recurring need for additional/associated resources) / need for frequent update /	**3**	**8**
						8	Cost of human-based service costs and BIM consulting		**1**
						9	Cost of technology / affordability		**1**
				c	Availability	**10**	availability of library	**8**	**2**
						11	availability of commercial assessment tools		**1**
						12	Availability of BIM training programs		**13**
						13	availability of framework and implementation plan / standards to guide implementation / legal framework for adopting		**4**
						14	availability of technical supports / documentation / noteworthy publications		**6**
						15	Trialability (possibility to try before deciding / availability of free trial software)		**4**
						16	long term providers : vendors / suppliers		**3**
						17	competition among the (IT) suppliers		**1**
				d	Observability	**18**	Communicability, demonstrability, profitability / promotion of BIM / marketing of vendors on BIM potentials /	**4**	**6**
						19	Proof of efficiency , cost savings and productivity gain by adoption		**7**
						20	availability of evaluation criteria and measures for firms		**1**
						21	Case studies		**3**
		2	**Company-relative characteristics**	**a**	Compatibility	**22**	BIM uses supported / applications / features	**4**	**6**
						23	Compatibility / applicability to existing processes		**11**
						24	BIM data schema pertinence		**1**
						25	nature of the construction industry (fragmentation of industry)		**2**
				b	Relative advantage or disadvantage	**26**	Relative advantage - disadvantage / perceived benefits / image motives	**6**	**9**
						27	Risks / share of risks with bidding BIM projects (types, size, teams, locations) / security concern (data, propagating		**6**
						28	cost / saving & cost reduction		**2**
						29	Productivity		**2**
						30	client's satisfaction with BIM projects		**1**
						31	consolidating marketing strategy		**1**
				c	Perceived Ease of Use (complexity)	**32**	complexity /simplicity / perceived ease of use / usability	**7**	**9**
						33	BIM standards, codes, rules, and regulations		**6**
						34	Convenience of BIM operation		**2**
						35	Ease of getting expected outcomes by BIM		**3**
						36	user-friendliness of BIM tools		**4**
						37	Frequency of errors made with BIM		**2**
						38	be confused or frustrated when using BIM / be comfortable		**1**
				d	Perceived Usefulness	**39**	Perceived Usefulness / suitability of BIM for practices, organization type, and project types / usefulness in my job (uses	**3**	**10**
						40	effectiveness (and benefits) of BIM / improvement of job satisfaction, work performance, communication, outcomes,		**8**
						41	Personal recognition about case of BIM operation		**1**
EXT	**EXTERNAL CONTEXT CHARACTERISTICS**	**1**	**External context (strong)**	**a**	Normative pressure	**43**	Availability of BIM professionals / trained professionals	**11**	**10**
						44	Consultant effectiveness / BIM knowledge within project consultants		**2**
						45	Contractual sharing norms, and procurement methods about ownership (contractors benefit from confusion, maturity of		**7**
						46	Procurement skills of client		**1**
						47	Devining levels of BIM working for reference in professional services agreements / advocation for the use of BIM for our practices b		**2**
						48	Culture of the sector (shared identity, norms, values and assumptions) and Awareness and readiness among industry		**3**
						49	Standardized work procedures for BIM / Guidance on use of BIM		**3**
						50	Performance measures and benchmarking of continuous improvement / metrics for quantitatively evaluating the		**2**
						51	Reputation in the industry of other projects in BIM		**1**
						52	Industry standards and wide use		**3**
						53	National applicability		**1**
				b	Coercive	**54**	**client's demands**, interest, effort, support (financial / other), pressure (refusal to deal)	**7**	**20**
						55	awareness, readiness, pressures or encouragement from the **construction players** (competitors, peer association, multi-		**13**
						56	awareness, readiness, pressures or encouragement from **team partners and subcontractors**		**17**
						57	push, incentive programs, or support from government (promotion, financial support, regulation) and policy /regulatory		**17**
						58	Globalisation and competitive strategies		**1**
						59	Increase of design and build / BIM demand		**1**
						60	Dependance on parent company		**1**
		2	**External context (weak)**	**a**	Mimetic processes	**61**	Industry market trend and wide use / willingness to use BIM by stakeholders	**8**	**4**
						62	Global openess or resistance toward BIM (subjective norm) / holistic readiness		**7**
						63	Awareness of the technology among industry stakeholders		**3**
						64	earliness of adoption (in the diffusion process)		**4**
						65	Environmental uncertainty		**1**
						66	Mimicking behaviours by imitating successful practices/competitors in the market		**1**
						67	Mimetic isomorphism in technology selection		**1**
						68	Willingness to recommend others to use BIM / recommand BIM to colleagues		**2**
INT	**INTERNAL CONTEXT CARACTERISTICS**	**1**	**Culture**	**a**	Identity, demographic and strategy	**70**	Organizational vision, challenges, policy and project strategy	**13**	**3**
						71	size (number of employees) / human resource		**3**
						72	experience (date de création de l'entreprise)		**2**
						73	specialisation / service		**2**
						74	Financial resources of organization		**2**
						75	Financial perspectives and economical health / ability to create business opportunities and possibilities		**4**
						76	hiring strategy (hiring people to keep knowledge) / outsourcing		**2**
						77	Organizational flexibility/adaptability to market / learning capability		**2**
						78	differentiation in market (unique products or services in a large market) / niveau de spécialisation		**1**
						79	level of internationalization		**1**
						80	Future needs		**1**
						81	technological capability of organization		**1**
						82	Brand image and identity communication / reputation		**2**
				b	Projects	**83**	physical size and cost of a project (square meters, cost and duration)	**6**	**3**
						84	complexity of projects (building shape or building systems)		**1**
						85	use of buildings (hospital, office, factory, etc)		**1**
						86	project delivery systems		**1**
						87	design changes ofteness		**1**
						88	project delivery system		**1**
				c	Innovativeness	**89**	organisational innovativeness	**6**	**2**
						90	Investments and initiatives / continuous investment / Financial resources devoted to IT technologies / software integration competi		**4**
						91	Intensity of IT integration		**2**
						92	Trainings ofteness		**1**
						93	Research and development capability of organisation		**1**
						94	resistance/openess to change		**1**
				d	Effectiveness	**95**	Availability and effectiveness of operations systems	**2**	**1**
						96	Cross cultural effectiveness among memebers of organization		**1**
		2	**Interactions**	**a**	Collaboration	**97**	internal information flows / information-sharing protocols	**7**	**5**
						98	human capability resources		**1**
						99	cross-training (job rotation)		**1**
						100	shared goals and values		**1**

				101	social network		1							x																								
				102	coordination and collaboration, collective efficacy, open discussion environment, colleague helps and		5							x												x		x							x				x	
				103	workspace environment		1																								x							
		b	Distribution of power hierarchy	104	project leadership style (democracy/autocracy)	7	2							x																	x							
				105	level of bureaucracy		1																								x							
				106	Leadership of senior management / corporate management style / strong leader		4															x						x			x							x	
				107	centralization / decentralization of decisions		2							x																	x							
				108	organizational complexity		1							x																								
				109	management : availability and effectiveness of managerial style / management's competence and will		3																				x				x						x		
				110	openess		1							x																								
		c	Partners	111	quality of relationships with partners and subcontractor / effective collaboration among project participants / trust and	3	6									x							x					x	x			x							x	
				112	willingness to share information among project participants		4															x							x						x				x	
				113	relationship with the client		1																														|x|
	3 Systems	a	Software	114	tools	5	1																	x														
				115	collaboration (project) management tools		1																					x										
				116	software distribution		1																													x		
				117	IT infrastructure / ICT infrastructure		3																		x		x									x		
				118	Satisfaction with current technology /existing cad systems that are already adequate in fullin the design and drafting		4		x									x													x							x	
		b	Hardware	119	Network fiability (power, internet)	2	1								x																							
				120	hardware and devices /data storage capabilities		3																x													x	x	
		c	Processes	121	IS infrastructure	5	1							x																								
				122	project control		1																	x														
				123	production process		1																	x														
				124	early involvement of project teams (owners, manahgers, architects, engineers,c ontracts, subcontractors)		2																								x							x	
				125	design process / project organization		2																	x												x		
	4 People	a	Top management	126	master BIM model manager	5	2															x						x										
				127	understanding of BIM processes and workflows / awareness / knowledge		7	x								x	x						x	x			x										x	
				128	personal innovativeness and openess to change (or resistance to change / change aversion) / employees' motivation to		8		x					x			x	x								x					x	x		x					
				129	liking in new technology / using tools, devices, etc / apprehension towards new technology		2																											x		x	
				130	ability to accept criticism		1																													x	
		b	employees	131	ancienneté et expérience	11	1																										x			
				132	self efficacy / computer self-efficacy		3																		x			x		x							
				133	experience (années d'expérience, pas en BIM)		2							x																						x	
				134	technical and technological competence of staff (IT expertise)		3							x		x															x							
				135	BIM trained, skills and expertise for high level of BIM (BIM personnel) in-house staff / BIM project experiences / Pre-		14		x		x			x		x			x		x	x			x			x			x		x		x	x	x	
				136	understanding of BIM processes and workflows / awareness / knowledge		7	x								x	x						x	x			x										x	
				137	worker attitudes and ethical behavior		1																							x							
				138	variation in practitioners' skills		1																													x	
				139	liking in new technology / using tools, devices, etc / apprehension towards new technology		2																											x		x	
				140	adoption of colleague		1																										x			
				141	willingness to collaborate		1																													x	
CHG	CHANGE CHARACTERISTICS	1 Dimension	a Extent	143	Need for BIM personnel and training	4	5	x						x													x				x				x			
				144	Needs for change in organization characteristics for BIM (types, size, structure, systems, culture, styles, processes) /		7	x						x				x	x			x						x			x							
				145	Needs for change and upgrading in hardware, software		1		x																													
				146	Quantity of projects/activity that need to be adapted		0																													
			b Depth	147	Perceived ease of implementation or incorporation into existing processes / time required / difficulty for learning /	5	12	x					x	x		x	x	x	x				x	x	x			x			x							
				148	investment cost for BIM / perceived cost / set-up cost / cost of implementation		15	x			x			x	x	x	x	x	x		x		x	x	x			x			x							x	
				149	Perceived risk for implementation (initial productivity affection, etc)		3							x				x									x											
				150	perceived need for organizational restructure		1							x																								
				151	perceived readiness (technical, readiness, organizational, procurement, policy)		1																									x				
			c Rythm	152	Time available for implementation / necessity / urgence	2	0																													
				153	Time souhaitable for implementation		0																													
		2 Interest and involvement	a Base	154	Base		0																													
				155	Déductif/inductif		0																													
			b Motives	156	Objectives, common objectives / needs (performance, etc) / necessity for future works / benefits motives / Project-	4	5							x											x							x			x		x	
				157	There are many : maybe not interesting to note		1																								x						
				158	subjective norm (perceived expectations from others for adoption)		2							x														x									
			c Attitude towards change	159	senior management support, reluctance or pressures / (top management support) (internal motivation to actively	11	9		x					x		x		x			x					x			x		x				x			
				160	Individual and group motivation to adopt BIM / interest / behavioral intention to use / continue using		6						x	x															x		x				x		x	
				161	team engagement		1																													x	
				162	Project manager's interest an dwillingness in adopting BIM		1																				x										
				163	consensus on appropriation		1																		x												
				164	attitude towards BIM / change (positive / negative)		3						x			x																			x		
				165	interest in learning BIM		1							x																								
				166	Opinion on the idea to use BIM (think it's a good idea/bad idea)		2						x												x													
				167	Appréciation de l'utilisation (appraising) (j'aime utiliser)		1						x																									
				168	organizational intention of Bim acceptance		1																		x												
				169	individual intention of Bim acceptance		2																		x											x	
		3 Practical implementation	a Change agent &	170	level of bureaucracy (for BIM adoption decision-making)	6	1							x																								
				171	approach for BIM : in-house ressources or outsourcing		2							x																	x							
				172	Team pilot project		1		x																													
				173	interdisciplinary of team for pilot project		1		x																													
				174	dedicated BIM/information manaager		1																													x	
				175	clear definition of roles		2																							x							x	
			b Pilot Project	176	Pilot project		0																													
			c Training	177	Training process	7	2		x													x																
				178	provide technical training		1																													x	
				179	Customization and capability challenge		1							x																								
				180	Training on strategic issues		0																													
				181	provide a common data environment (CDE)		1																													x	
				182	make sure the processes are in a logical order (sequence)		1																							x							
				183	select appropriate tools to perform the applications		1																							x							
			d Method and strategy	184	clear definition of Implementation plan and clarity of implementation process / document BIM execution plan including,	7	3																				x				x							x	
				185	Choice of a Pilot project (size (square meters, cost and duration)		1							x																								
				186	definition of project goals clear definition of objectives and requirements before formation		1																							x							
				187	clear definition of processes / determine model content requirement (data exchange, information exchanges, reference		1																							x							
				188	clear definition of objectives and requirements		1																							x							
				189	managing people resistance to Bim change		1																							x							
				190	adopt lean process (pull flow)		1																							x							
			e Communication	191	Communication level (Openess for discussion about innovation)	5	1							x																								
				192	Communication type		0																													
				193	adopt effective communication, collaboration, coordination practices and use adequate communication coll coor tools		1																													x	
				194	setup feedback loop for process improvement (continuous improvement)		1																							x							
				195	raise issues as soon as they emerge		1																													x	
			f KPI / metric measurement	196	client satisfaction - product	9	1																									x					
				197	client satisfaction - service		1																									x					
				198	defects		1																									x					
				199	predictability - cost / time		1																									x					
				200	profitability / productivity /return on investment / performance		2																									x			x		
				201	construction - cost / time		1																									x					
				202	setting check points during the project's lifecycle		1																													x	

	203	level of stress during implementation		**0**																															
	204	level or errors during implementation		**0**																															
g Risk management	**205**	define model authors, users, managers throughout project life cycle / avoiding/hiding potential risks and liability	**3**	**2**																							x						x		
	206	legel issues around ownership, IP&PI insurance terms		**4**																		x					x		x				x		
	207	selection of project delivery methods (design-build, design-bid-build, CM) / sharing of risks and rewards among team members that are tied to project success / defining of the contracting/contract arrangement / definition of terms of payment / selection criteria for procurement (cost based, quality-cost based)		**2**																							x						x		