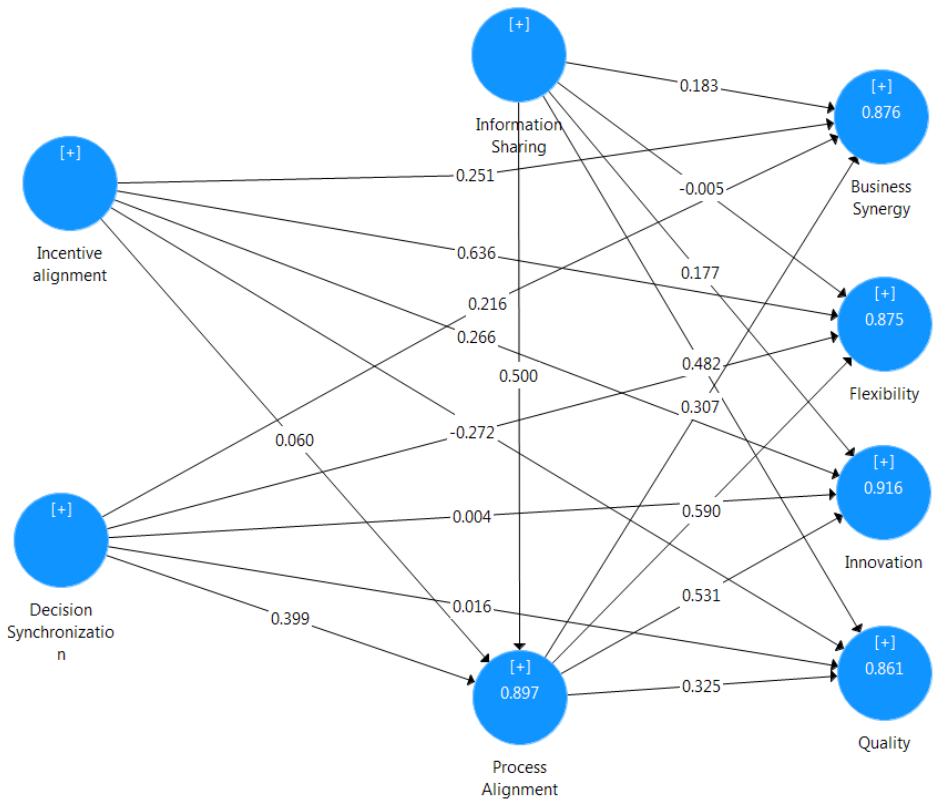

Figure 3. PLS Results for construct model

Based on [31], the composite reliability is more consistent with Partial least squares that Cronbach's Alpha, and the recommended value for the composite reliability (0.8) is consistent with the recommended value for Cronbach's alpha (0.7),the reliability was assessed using the composite reliability and Cronbach's alpha coefficients. As shown in Table II (appendix 2), all constructs have a composite reliability's value greater than the threshold value of 0,80, and a Cronbach's Alpha value greater than 0,70.

The discriminant validity were tested using the cross-loading criterion, which is also called "item-level discriminant validity."[32]. Discriminant validity is ascertained when all constructs items correlates weakly with all other constructs except for the one to which it is theoretically associated.

According to [33], "the measure in question is unable to discriminate as to whether it belongs to the construct it was intended to measure or to another (i.e., discriminant validity problem)". In our case, all indicator's loading was greater than all its cross-loadings.

B. *Structural model evaluation*

The second stage in our PLS analysis was the structural model analysis. The full results are shown in Table III (Appendix 2) and graphically in Fig.3

Before starting with the model validation, we used the most cited criterions to assess the fitness of the hypothesized model with PLS, namely the GoF or the overall goodness of fit, the Standardized Root Mean Square Residual (SRMR), and the exact model fit (bootstrapped based statistical inference).

The Goodness of Fit is the geometric average of all communalities and R^2 of the endogenous constructs.[34]

$$\text{GoF} = \sqrt{Communality * R^2} = \sqrt{AVE * R^2} = 0{,}961$$

0,961 is higher than the cutting value of 0.5, which means that the set of structural equations was well defined, offered a good representation of the dataset and was valid with a «moderate» fitness. [35]

Table I. Common method variance

Construct	R^2
Process alignment	0,897
Business synergy	0,876
Flexibility	0,875
Innovation	0,916
Quality	0,861

To avoid model misspecification, we used the second model fit criterion, the Standardized Root Mean Square Residual (SRMR), which is the standardized difference between the observed and the predicted correlation. For our model, the

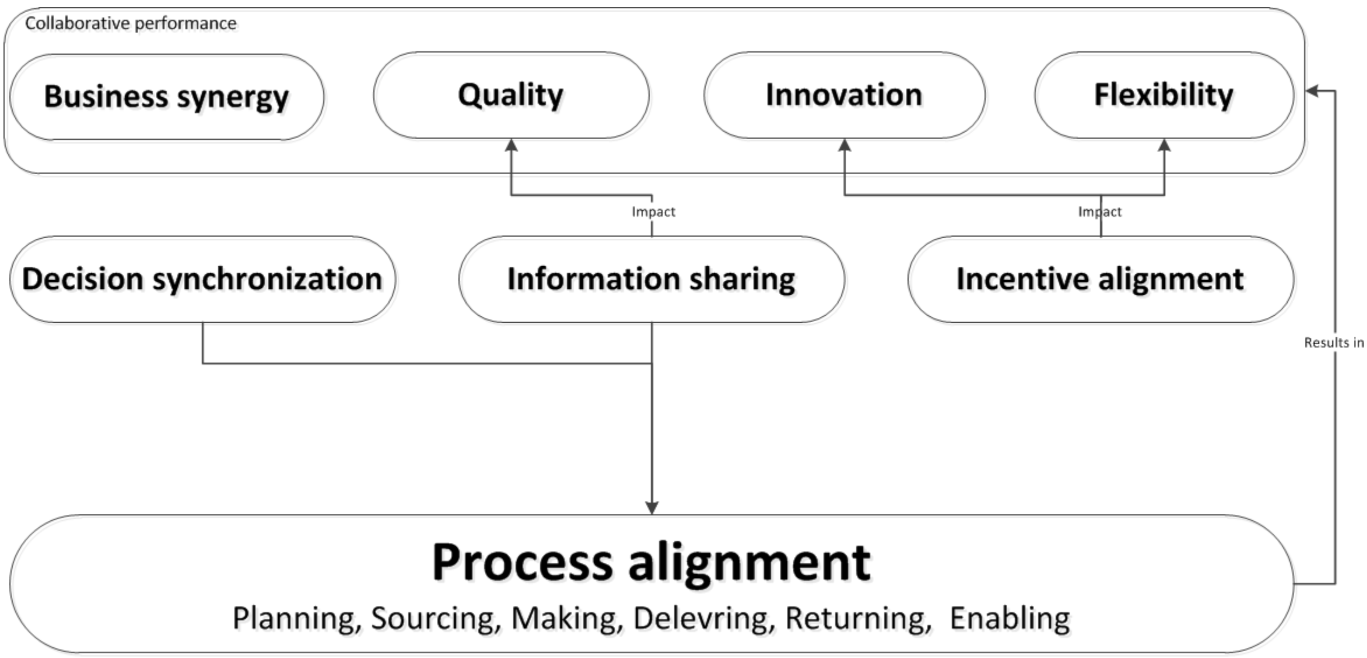

Figure 4. Approuved Framework

SRMR was 0,060, which is less than the cutoff of 0,080.[32], [36]

The third model fit criterion was the exact model fit which defined by Dijkstra and Hensler [37] as "the statistical (bootstrap-based) inference of the discrepancy between the empirical covariance matrix and the covariance matrix implied by the composite factor model". To quantify the discrepancy between two matrices, the geodesic discrepancy (d_G) must be lower than 95% bootstrap quantile (HI95 of d_G) and the unweighted least squares discrepancy (d_{ULS}) must be lower than 95% bootstrap quantile (HI95 of d_{ULS}) [37], which was the case in this study.

To assess the structural model for relational and moderation hypotheses, we used the analysis criterions suggested by [38]. They suggested using R^2 and adjusted R^2, path coefficients via a bootstrapping procedure with a recommended resample of 4999 and the corresponding t-value, p-value and confidence intervals, they suggested also to use f^2 to quantify how substantial the significant effect are.

To generalize from a sample to a population, the path coefficient was evaluated for significance, and the results are shown graphically in Fig.3. The results support the impact of two collaboration practices in all collaborative performance attributes. Negative path coefficients are identified between decision synchronization and flexibility, and between information sharing and flexibility.

As suggested by [38], a path coefficient, via a bootstrapping procedure, is regarded as significant (i.e. unlikely to purely result from sampling error) if its confidence interval does not include the value of zero or if the p-value is below the pre-defined α-level, the effect size f^2 above than 0,02. Table III (Appendix 2) shows the bootstrapping results.

We relied on bootstrapping to test for the mediating role of the process alignment between supply chain practices and performance attributes. The results of the mediating effects are reported in Table IV (Appendix 2). The indirect effect of the collaboration practices on the performance attributes was validated. The final framework with only approved relationships is shown in Fig.4.

DISCUSSION AND CONCLUSION

The research results show that supply chain collaboration practices lead to process alignment between supply chain partners, and then impact the firm's collaborative performance. These findings were already confirmed in the literature [1] and now on a large sample of firms from different industries in Morocco. 4 main contributions to the literature on supply chain collaboration and performance result from this study: (Fig.4)

The first is the positive and significant impact of the decision synchronization, information sharing and incentive alignment on the process alignment. Previous studies have acknowledged a lack of agreement on the collaborative practices that impact firm's performance, and a lot of factors affecting supply chain collaboration have been identified [15]. We used the most cited collaboration practices, namely Information sharing, decision synchronization, process alignment and incentive alignment. After discussion with practitioners in Moroccan industry, they suggested to add process alignment as a mediating factor between collaboration and collaborative performance.

The findings of this study confirmed that collaborative practices help firms to design efficient supply chain processes that allow them to deliver products to end customers in better conditions of time and cost. Information sharing lead to more responsiveness and flexibility on executing and controlling supply chain processes, by providing a common basis for shared actions by different functions across interdependent firms.[1], [39], [40]

Decision synchronization has been approved to have a positive and significant impact on process alignment, it motivates the chain actors to have a sense of belonging and to be engaged in all decisions toward a common goal of handling end customers expectations. Decision synchronization enables productive common actions associated with integrated supply chain processes such as product assortment, replenishment, transportation, and customer service.[3]. Surprisingly, incentive alignment was found to have no significant impact on process alignment, and it's due to the classical approach of supply chain management through Moroccan industry, in which the only adopted incentive scheme is pay-for-performance.

The second contribution is the positive and significant impact of the process alignment on the collaborative performance. It helps the chain actors to synchronize their integrated daily activities required to deliver products that fulfill end customer requirements with high quality [3] and thus lead to better performance and reliability. For example, researchers [41] argued that "firms can reduce inventory and increase customer-service levels by integrating supply chain planning and control process with those of its customers which ultimately results in reducing the bull-whip effect".

The third contribution of this work was the direct, significant and positive impact of the incentive alignment on the flexibility and the innovation within supply chain. Incentive alignment ensure that the costs, risks and benefits of innovation will be shared amongst the chain members, and thus lead to the commitment of each party to the innovation effort, change process quickly and more flexibility with customer inputs in all product development stages, and thus results a better acceptance of the products and services [5]

The study has also confirmed the direct, significant and positive relationship between information sharing and quality. This finding has been consistent with other researchers' findings. Information sharing facilitates clarity about demand reduce excess inventory, avoid costly bullwhip effect, which decrease uncertainty, increase visibility, operational effectiveness and efficiency, and then enhance customer service quality. [25]

The results of this work provide also a useful managerial insight into the improvement of collaborative practices in supply chain in Moroccan context. Furthermore, the study provides several guidelines for future research. Future research could consider the operationalization of the collaboration dimensions and performance criteria based on case studies. More data may be collected from other firms to revalidate the measures and structural models taking in consideration more variables, as respondents seniority level, industry sector and sample size.

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APPENDIX 1 : MEASURES

Construct	Measure	Description
IA: incentive alignment	Please indicate the use of the following practices with your suppliers and customers:	
	IA01	Joint frequent shopper programs (Co-promotions)
	IA02	Shared saving on reduced inventory costs.
	IA03	allowance for product defects.
	IA04	Subsidies for retail price markdowns
	IA05	Agreements on order changes
	IA06	Research & Development Cost & Risks
	IA07	Product Warranty
	IA08	Co-develop systems to evaluate and publicize each other's performance
IS: Information sharing	Please indicate which informations you share with you partners:	
	IS01	Product design
	IS02	Sharing cost information
	IS03	Future product development plan
	IS04	Supply & Demand forecast
	IS05	Promotional events
	IS06	Points-of-sale (POS) data
	IS07	Price changes
	IS08	Inventory information (holding costs, level, policy …)
	IS09	Supply disruptions
	IS10	Order status or order tracking
	IS11	Delivery schedules
DS: Decision synchronization	Please indicate which decisions you make jointly with your partners :	
	DS01	Joint plan on product assortment
	DS02	Joint plan on promotional events
	DS03	Joint development of demand events & forecast
	DS04	Consultation on pricing policy
	DS05	Joint decision on availability level
	DS06	Joint decision on inventory requirements
	DS07	Joint decision on order management
PA: Process alignment	Please indicate which processes you aligned with your partners:	
	PA01	Planning processes
	PA02	Sourcing processes
	PA03	Making processes
	PA04	Delivering processes
	PA05	Returning processes
	PA06	Enabling processes
	Please indicate the extent to which your company is consistent on the following performance dimensions:	
BS: Business synergy	CPBS01	Integrated knowledge bases with SC partners
	CPBS02	Integrated marketing efforts with SC Partners
	CPBS03	Integrated Production system with SC Partners
	CPBS04	Integrated IT resources
F: Flexibility	CPF01	Product and services efficiency
	CPF02	Customized products responsiveness
	CPF03	Handle Customer's requirement volume and schedule variation efficiently
I: Innovation	CPI01	SC partners develop new products quickly
	CPI02	lower Time to market
	CPI03	SC Partners innovation
Q: Quality	CPQ01	Product reliability
	CPQ02	Product durability
	CPQ03	Product Quality
	CPQ04	SC partners collaborate to improve product quality

APPENDIX 2: PLS AND BOOTSTRAPPING RESULTS

TABLE I. CONSTRUCT RELIABILITY AND VALIDITY

Construct	Indicator	Item loading	Composite reliability	Communality (Average variance extracted)	Cronbach's Alpha
Incentive alignment	IA01	0,783	0,950	0,706	0,940
	IA02	0,835			
	IA03	0,890			
	IA04	0,808			
	IA05	0,829			
	IA06	0,821			
	IA07	0,880			
	IA08	0,868			
Decision synchronization	DS01	0,840	0,931	0,708	0,931
	DS02	0,832			
	DS03	0,838			
	DS04	0,857			
	DS05	0,836			
	DS06	0,857			
	DS07	0,828			
Information sharing	IS01	0,809	0,956	0,662	0,949
	IS02	0,805			
	IS03	0,778			
	IS04	0,852			
	IS05	0,830			
	IS06	0,798			
	IS07	0,844			
	IS08	0,869			
	IS09	0,858			
	IS10	0,727			
	IS11	0,770			
Process alignment	PA01	0,892	0,946	0,744	0,931
	PA02	0,857			
	PA03	0,865			
	PA04	0,791			
	PA05	0,895			
	PA06	0,871			
Business synergy	CPBS01	0,906	0,937	0,789	0,910
	CPBS02	0,857			
	CPBS03	0,8877			
	CPBS04	0,910			
Flexibility	CPF01	0,891	0,928	0,811	0,883
	CPF02	0,886			
	CPF03	0,924			
Innovation	CPI01	0,849	0,920	0,793	0,869
	CPI02	0,885			
	CPI03	0,936			
Quality	CPQ01	0,912	0,931	0,772	0,901
	CPQ02	0,894			
	CPQ03	0,895			
	CPQ04	0,809			

TABLE II. DIRECT EFFECTS: PATH COEFFICIENT RESULTS

Hypothesis	Original sample	Bootstrapping mean	Standard deviation	2,50%	97,50%	T Statistics	P value	f²	Decision
IA -> BS	0,251	0,254	0,158	-0,049	0,572	1,588	0,113	0,034	Non supported
IA -> F	0,636	0,617	0,154	0,305	0,92	4,142	0	0,216	Supported
IA -> I	0,266	0,269	0,107	0,062	0,474	2,481	0,013	0,056	Supported
IA -> Q	0,123	0,13	0,139	-0,127	0,395	0,885	0,376	0,007	Non supported
IA -> PA	0,06	0,064	0,139	-0,197	0,338	0,432	0,666	0,002	Non supported
DS -> BS	0,216	0,207	0,178	-0,134	0,576	1,213	0,225	0,021	Non supported
DS -> F	-0,272	-0,251	0,142	-0,544	0,038	1,918	0,055	0,032	Non supported
DS -> I	0,004	-0,001	0,139	-0,28	0,256	0,026	0,979	0	Non supported
DS -> Q	0,016	0,02	0,141	-0,251	0,284	0,111	0,912	0	Non supported
DS -> PA	0,399	0,397	0,153	0,079	0,69	2,264	0,009	0,092	Supported
IS -> BS	0,183	0,192	0,153	-0,101	0,487	1,201	0,23	0,016	Non supported
IS -> F	-0,005	-0,008	0,158	-0,302	0,294	0,031	0,975	0	Non supported
IS -> I	0,177	0,186	0,103	-0,016	0,388	1,7021	0,086	0,022	Non supported
IS -> Q	0,482	0,489	0,142	0,225	0,757	3,403	0,001	0,098	Supported
IS -> PA	0,5	0,498	0,117	0,255	0,727	4,281	0	0,167	Supported
PA -> BS	0,307	0,303	0,143	0,018	0,579	2,142	0,032	0,078	Supported
PA -> F	0,59	0,592	0,111	0,383	0,806	5,324	0	0,287	Supported
PA -> I	0,531	0,523	0,105	0,332	0,73	5,035	0	0,346	Supported
PA -> Q	0,325	0,307	0,118	0,083	0,524	2,743	0,006	0,078	Supported

TABLE III. MEDIATION EFFECTS: BOOSTRAPPING.

Hypothesis	2,50%	97,50%	P value	Decision
IA -> PA-> BS	-0,077	0,114	0,686	Non supported
IA -> PA-> F	-0,117	0,217	0,672	Non supported
IA -> PA-> I	-0,111	0,18	0,665	Non supported
IA -> PA-> Q	-0,076	0,108	0,666	Non supported
DS -> PA-> BS	0,001	0,301	0,121	Supported
DS -> PA-> F	0,048	0,435	0,017	Supported
DS -> PA-> I	0,037	0,427	0,033	Supported
DS -> PA-> Q	0,012	0,296	0,079	Supported
IS -> PA-> BS	0,008	0,327	0,066	Supported
IS -> PA-> F	0,127	0,494	0,002	Supported
IS -> PA-> I	0,127	0,426	0	supported
IS -> PA-> Q	0,036	0,297	0,016	Supported