INFORMATION SYSTEMS AND PERFORMANCE: THE CASE OF "TOUR DE FRANCE" RACING CYCLISTS

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INTRODUCTION

This research analyses the results of twelve Tours de France competitions in order to compare the gaps at arrival between the riders before and after the introduction of developed information systems. Developed information systems for professional cycling include the use of radio links between riders and team managers (headphones), TV screens in the car of team managers, GPS localization for instant measures of gap between riders, SRM,…

More generally, information system can be defined as a set of interrelated components that collect, process, store, and distribute information to support decision making and control in an organization (Laudon and Laudon, 2007). Also, information systems can help organizational actors to analyze problems or to understand complex situations. Informational uncertainty decreases with the use of information system (Daft and Lengel, 1986) and we can suppose that actions are more rational. Literature on information system assumes that information system improve decision making and because organizational actors receive more accurate information on time, they become much faster at making decision.

Our research supposes that cycling teams are similar to organizations as they have formal structures and use resources to produce output (in our case: best individual classification by time). During a professional road cycling race, riders have better information at the right time to make a rational decision. Consequently, we can suppose that the use of developed information system had lead to the reduction of gaps between riders. And we can suppose that the grouping of riders may reduce the quality of the sportive show. However, this issue is important for the organizing of competitions. Thus, the UCI or the ASO (Tour de France organizer) are examining the possible suppression of headphones in order to permit to create uncertainty during the courses and thus to favour the interest of spectators.

METHODS

We obtained the time for each rider of all stages from twelve Tours de France (245 stages and 40.130 individual times). Tours de France 1991, 92, 93, 94, 95, 96 are considered without developed information systems and Tours de France 2000, 01, 02, 03, 04, 05 are considered with developed information systems. We tested two assumptions:

A1- Since the systematic use of developed information systems, sprints are more frequent.

A2- Since the systematic use of developed information systems, gaps between riders (finish stage) are less important (time's concentration).

In order to test these assumptions:

– We counted the number of sprints of the bunch for the win of the stage between two periods (before and after developed information system) and we compared the results through a Chi-square test (A1).

– We measured rider's time dispersion for each stage and we calculated the coefficient of variation (ratio of the standard deviation to the mean expressed as a percentage) for the first thirty riders of each stage. We had to compare results between two periods for each type of stage (mountain, flat stage, individual time trial,…) with an independent-sample T Test procedure (A2).

RESULTS

Our results show that contrarily to assumptions, the introduction of developed information technology did not improve stage finish for the sprint of the bunch (table 1) and did not lead to squeeze up the gaps between riders (table 2). This introduces a new vision of performance under the angle of efficiency. The results may be resumed as following:

Table 1: Sprints of the bunch during flat stages.

Type	No sprint (success from an escape group)	Sprint (success from the bunch)	Total
Before IS	29	33	62
Frequency	46,77%	53,23%	100%
After IS	24	33	57
Frequency	42,11%	57,89%	100%
	53	66	119
Khi 2 value : 0,262 – not significant effect.			

Table 2: Coefficient of variation for the first thirty riders of each stage.

	n	CV before IS	n	CV after IS	Sign	Result
Total	125	0,65	120	0,78	Ns	Dispersion
Ind.Time Trial	18	1,94	16	1,77	Ns	Concentration
Road race	107	0,44	104	0,63	0,1	Dispersion
Flat stage	62	0,22	57	0,55	0,05	Dispersion
Middle mountain	15	0,76	13	0,82	Ns	Dispersion
Moutain stage	30	0,72	34	0,68	Ns	Concentration
Flat finish	88	0,35	84	0,6	0,1	Dispersion
Mountain finish	19	0,85	20	0,76	Ns	Concentration
ns: for not significant level						

DISCUSSION

Our research may be resumed as the answer to the following question: do headphones (as information systems) in a cycling competition reduce the quality of the sportive show? Our results show that this is not the case (taking only into account the gaps at arrival). Thus, the suppression of headphones would not improve the show.

As far as the effects of headphones on time dispersion are considered, two major perspectives can be considered:

– If general dispersion increases, this is due to more freedom given to the non dangerous riders for general classification during non dangerous stages. The management of the effort of the leader's teammates is more effective. In other words, we can analyze this perspective as a rationality improvement (Simon, 1947).

– We can understand these results through the structurationism point of view (Orlikowski, 2000). It is not the technological determinism in the use of information technology that shapes an emergent use of technology but the interaction between technology and organizational actors.

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